The Builder.

Vol. XIV.—No. 708.

IN our last we offered some information on the subject of foundations for Bridges, with more especial reference to those which were being put in for the proposed bridge at Westminster. Captain Moorsom (who, in a letter published the other day, applies a term to the new structure not justified by the report of the committee, or the actual state of affairs) once claimed, we believe, to have made an application of the iron-plate and concrete system of building piers, prior to its use in the Chelsea and Westminster Bridges. In his bridge for the Birmingham and Gloucester Railway, over the Avon, near Tewkesbury, completed in 1840, caissons were formed of cast-iron flanged plates, ¾ inch thick, screwed together by bolts, and having the joints made with iron cement. The site of each pier was first prepared with a scoop-dredger, worked from a platform erected on piles. The lower row of plates for the caisson was put together and suspended in the water by iron rods, while the other rows were added; and the whole was gradually lowered as the work proceeded, till the bottom rested on the bed of the river. Clay was then thrown round, externally; and this formed a joint impervious to water,—so that the caisson was emptied in six hours. Subsequently, as we understand the account, excavations went on inside the caisson; which was next filled for the first 12 feet with solid masonry and concrete; and upon this, hollow masonry was laid to support the "cap-plates," carrying eight pillars in each pier. The caissons taper upwards for part of their height.* The suggestion of the use of this method of construction originated with Mr. Ward, of Falmouth, who was the resident engineer. The method was represented as cheaper than "coffer-dams and stone piers."

But, judging from the account, it may be doubted whether the coffer-dam principle was really dispensed with; for certainly the description of Captain Moorsom's bridge and that of the new Westminster-bridge differ in some important particulars. Mr. Page, in the course of his statement to the committee, has given a long list of bridges founded without coffer-dams, with piers similar to, or less durable than those of his own design. In the Westminster-bridge the piers below low-water are formed of a series of wooden piles, with concrete filling to the inter-spaces, inclosed by an external casing of cast-iron to the pier. In each pier are 145 elm piles, chiefly in rows transversely of three and five alternately. These piles average 29 feet 6 inches in length, and are driven through the gravel, and about 19 feet into the solid London clay, here said to lie at from 28 to 32 feet below Trinity high-water mark, with a uniform surface. The cast-iron piles are of two kinds, namely, hollow round piles, of 15 inches diameter, with grooves or flanges cast on them, and plate or flat piles, cast with flanges for strength. These two kinds of piles are placed alternately, the flat piles being driven down after the round piles between the grooves or flanges of the latter; and thus, say the reporters, "it is proposed to inclose within an iron case not only the wooden piles and concrete deposited inside the piers, but also the bed of the river, gravel, and clay, to the depth to which the plate piles are driven, that is, to 21 feet below low-water." The loose mud and sand are then removed from the inclosed space down to the gravel: by aid of the diving dress the opposite cast-iron piles are then united by strong wrought-iron tie-bolts in two tiers; and lastly, the concrete is deposited between the wooden piles, or throughout the unoccupied area of the pier within the casing, up to the level of low-water. It is, however, explained, that the heads of the cast-iron plate piles are driven 6 feet below low water, whilst those of the round piles stand 1 foot above low water. "The spaces so occasioned in the iron casing are filled up with granite slabs, 18 inches thick, the lower end of the slabs resting on the head of the plate piles, and the upper standing 2 feet above low water, ready to receive the first course of masonry. These several works completed, the wooden piles are cut off to an uniform level of 6 inches above low water; a block of stone, 18 inches thick and 4 feet area, is solidly bedded on the head of each bearing pile; the spaces between these blocks are filled in with concrete, and the whole surface of the piers, including the granite slabs, is levelled off to the height of 2 feet above low water, to receive the first course of masonry." This first course is of solid granite, 2 feet thick. Above, the piers are faced, only, with granite, the interior being filled in with brickwork. The masonry of the piers terminates 2 feet above Trinity high-water line, from which level the iron arches spring.

Our engravings on the next page represent the plan of half of one of the piers, showing the top of the iron sheathing-plates and the tie-rods, part of the longitudinal section, and a transverse section of one pier. These differ somewhat from the illustrations given in the report of Messrs. Rendel and Simpson, but show correctly the real intentions of the engineer. Originally it was intended to have an iron curb all round the pier, above the bearing piles, but this has been abandoned, and it is proposed further that the granite plinth course should be made to project sufficiently to protect the piles.

Various modes have been adopted in other bridges for directing the current, and as supplementary precautions against the undermining of piers. We may refer to paving the bed of the river, or the laying an inverted arch; to the depositing stones, or the encasing the platform of foundations with sheet-piling. Mr. Page, however, proposes to dredge the channel out beneath each arch to a regular curve, commencing at 3 feet below low water at the piers,—laying bare the clay at the centre, so as to give a low-water depth there of about 12 feet. Afterwards, all round the piers, for a width of about 6 feet, the gravel is to be dredged out down to the clay, and the trench or excavation thus formed is to be filled with concrete.

Taking the permanent character of the bridge to depend upon the soundness of the foundations below low water, the reporters objected to the method of construction, that the sub-structure of such piers is dependent on the combined action of several classes of materials, differing in their strength and manner of application; that the strength of each part is liable to suffer by the failure of any one; and especially that the fracture, or the improper execution of any portion of the outer cast-iron casing might entail very serious results. Supposing the principle of the sub-structure were a good one, they conceive a coffer-dam would be peculiarly requisite to carry it out with proper supervision, and to ensure the faultless execution which they say the permanence of such a class of work would demand. They question whether the bottom of the river would retain the peculiar form intended to be given to it, and think that the concrete banks round the piers must in no long time be broken up, and the piers weakened "by increase of their unsupported height" and the diminution of the depth and solidity of the material through which the piles of which they mainly consist are driven." They have other objections to the particular scheme of New Westminster-bridge, as proposed by Mr. Page, and irrespective of the system of foundations, and appear to doubt the economy resulting from the construction of the bridge, half at a time, intended to save the cost of a temporary bridge, and on the whole, they "do not feel that any plan which does not comprise solid stone piers and abutments, carried down deep into the London clay, can be regarded as possessing a permanent character."

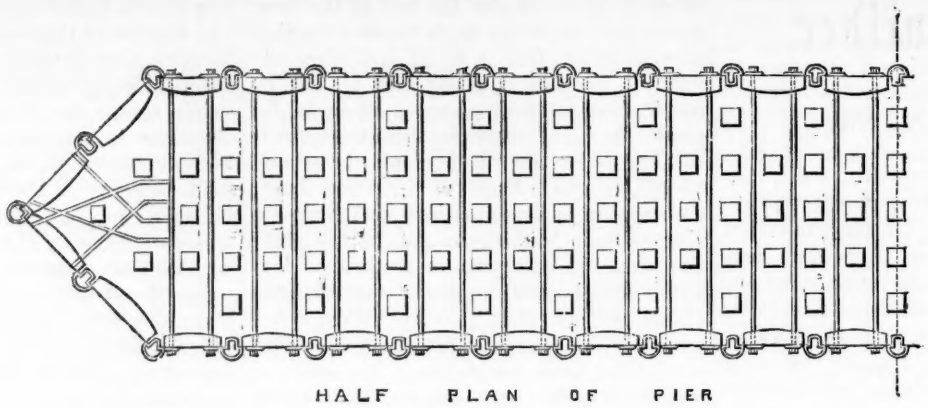
On looking at the specification of London-bridge, we find that the earth for the foundation there, was required to be excavated to such depth that the tops of the platforms of foundation should be not less than 40 feet below Trinity high-water mark, in the case of the two side piers, and 43 feet in the case of the middle piers; and that when the earth had been excavated, piles were to be driven to sustain the weight of those platforms and the superstructure, as much as 18 feet below the lower side of the platforms, — elaborate contrivances being further provided in their construction, as by the connection of the heads of the piles, filling in of the spaces, and the laying of planks, 6 inches in thickness, bedded in mortar, and by the addition of sheet piling round the circuit of the platform. Thus, a depth of 43 feet, plus 18 feet, or perhaps 20 feet, equal to 63 feet, at a fair computation, may be set down as attained, measured from the level of high-water mark; whereas, in the plan being pursued in new Westminster-bridge, a total depth from the same point, of 48 feet for the bearing piles of timber, and of about 43 feet for the round piles of iron has been considered sufficient,—supplementary protection being sought for by the banking of concrete, which we may take as in lieu of the deep-seated sheet piling of the other case. But, the bearing piles in New Westminster-bridge, do pass nearly 20 feet into the clay,—though they stand about 11 feet above it, or 7 or 8 feet above the gravel. The round piles may be stated as extending 12 or 13 feet into the clay, and as having the same height above. It is possible that a greater depth might have been secured without the aid of coffer-dams. Thus, the question of the advantage of the system of founding and building piers, depends upon other elements in the investigation. The permanance of the iron casing seems to be the chief subject for notice.

Mr. Hawkshaw, in his evidence, stated, Mr. Mallett's experiments showed that the mean corrosion of iron in what he calls clear fresh river water was one grain per square inch of surface. "Now the weight of a cubic inch of iron is 1,700 grains, and this was the amount of corrosion in two years. The result of that would be, that supposing only one surface of cast-iron plate were exposed, then it would take 3,362 years totally to corrode a plate an inch thick; but if both surfaces were exposed, it would take 1,681 years to eat through a plate an inch thick,—of course assuming that experiment as the basis."

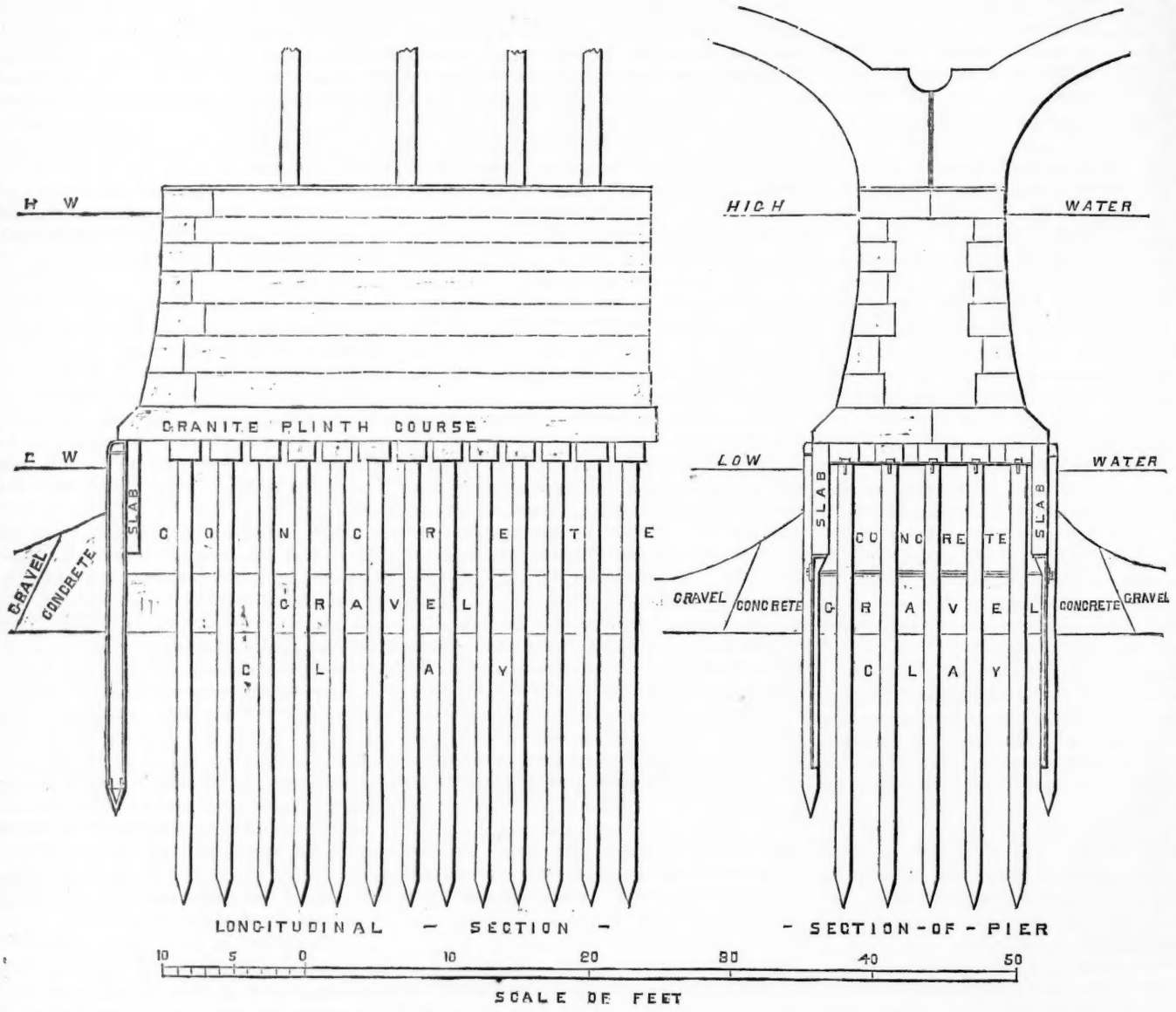
The result of an experiment where cast iron was immersed in foul sea-water was, that it would take 506 years to eat through an iron plate, acting upon one surface, and 253 years to eat through it acting on both surfaces. Any irregularity of action, as arising from the quality of the iron, might, of course, lead to a different result.

Mr. Hawkshaw, we may add, thought the work had been done exceedingly well, and that the foundations were fully equal to what they had to do. He did not think the embanking of the Thames would affect the bed of the river at

* Minutes of the Institution of Civil Engineers. Vol. III. 1844, p. 60.



HALF PLAN OF PIER



THE FOUNDATIONS FOR PROPOSED BRIDGE AT WESTMINSTER.—Mr. Page, Engineer.

this particular point; and further, was of opinion, that the increased water-way which would be given by the new bridge would lessen the tendency to scour.

Some action on the iron, reverting to the other part of his evidence, can hardly be avoidable: and though that element of weakness may be of trifling moment in the case of wharf-walls, where a mere casing can be renewed, it would be deserving of more notice in what is designed and required to be of still more durable character, and where the substance of the pier would be acted upon but for the presence of the outer shell.

Mr. Page, however, from his own observations of the action of water on cast iron, says "a deposit of oxide of iron is formed on the surface, which actually protects the iron itself;" and Mr. Mallet, who has made experiments in great detail, states that iron coated with purified gas-tar will last for ages.

As to the resistance to concussion by fouling of barges or otherwise, that of course is a very important point. The proposal of the engineer included protection to the piers by floating fenders or booms, and perhaps this provision has created more than its share of prejudice. Such measures of precaution might be thought desirable in any case. The question is, how far any positive dependence is placed upon them.

However, the committee inquiring into the sufficiency of the piers "to bear the weight to be put upon them, and how far such a construction can be considered permanent," have decided "that the piers will be secure so long as the iron casing remains sound," and that the "casing can be replaced whenever it may decay or be destroyed."

The importance of the structural question is great: it has to do with the sufficiency of the Chelsea-bridge, if not other bridges and foundations, and with the course which should be adopted in many future cases.

Let us look at the answers that were given to the main objections raised by the reporters. Mr. Robert Stephenson, on his second examination, when he had looked into the matter more thoroughly than at first, felt perfectly certain

that the scouring could not take place, and that there was no reason whatever to apprehend any change in the bed of the river. Then, as to the use of coffer-dams, Mr. Stephenson said that if he had been called upon to design a bridge in that situation, he should have the spans as large as possible, and have used coffer-dams; "*but*, to use a coffer-dam now, with such spans, would actually fill the river up; you could not do it. Therefore, if you once fix the spans to be adopted, you negative the adoption of coffer-dams." Now, as it seems that the small spans were fixed for Mr. Page (very foolishly as we have always thought, and as we noticed long ago when giving a view of the proposed bridge), Mr. Page can scarcely need a more complete exoneration in this respect.

Desiring homogeneity, Mr. Stephenson further stated, he would not put any weight upon the iron and granite casing, and he believed that the piers wholly detached from this were amply sufficient to bear the weight. He saw no insuperable obstacle to building the second half of the bridge as proposed, and first suggesting some additional provision with regard to the expansion and contraction of the iron, he thought there was nothing to fear in going on with the work. The greatest inconvenience that might arise, whether it was 50, 100, or 150 years hence, he thought would be from the decay of the iron which might have to be replaced.

After very full consideration of the subject, we have arrived at the same conviction, and we trust that Mr. Page will be permitted forthwith to carry out his design to completion, with such improvements as may have been suggested, or have suggested themselves, during the inquiry, and that, so far from finding any additional cold water to contend with, beyond that provided by Father Thames, he will be strengthened and encouraged by the good wishes of his professional brethren, and the generous confidence of the governing powers.

ON THE DRYING AND BURNING OF BRICKS.*

In the preceding paper I arrived at that stage of the manufacture in which machinery may be considered to have rendered us all the aid that we require of it, and left the plastic clay formed into bricks. In proceeding with the manufacture, we have next, by means of evaporation, to get rid of the water with which it was necessary to work the clay for the purpose of making it ductile. The oldest system is that of laying the bricks, as moulded, on floors or flats. These are spaces of ground worked very smooth, of a slightly convex form, from six to ten yards wide, and of any desired length. The bricks are exposed on these flats until they are stiff enough to bear being removed by hand: they are then walled or hacked on each side of the floors, from six to twelve high, one row on another, with a space of from half to three-fourths of an inch between each brick, to allow a current of air between them. They are then covered with roofing tiles, or tiles made on purpose, and, in some instances, with straw; then left until they are sufficiently dry for the last process—burning. In some works the bricks are hacked as they are made, by the use of pallet-boards, and as explained in the making by the machine. This is the general system of the present day, and the reason why the manufacture is restricted to one season of the year. For during the winter, the late autumn, and the early spring, on account of the lower temperature of the atmosphere, shorter days, and absence of sun, the bricks would be a very long time in drying, and a frost would totally destroy all containing any moisture. In dull, damp seasons, this process is very slow and tedious. The bricks are also much deteriorated in quality from the washing of the rains on the floors, or against the ends of them in the hacks. In such seasons, a brickmaker, in order to get over his usual amount of work, often requires double the extent of drying ground, each moulder occupying about half an acre of land for this purpose only; and the extent of ground required gives to brick-works near London the title of brickfields, and in the country that of brick-yards. Bricks are sometimes dried in hacks under sheds, but for large works, in which machinery is used for making them, the quantity of shedding required would be so great, that it would be better to erect more improved constructions.

When the brick is partially dry, and quality is a consideration, it is the practice in some works, where hand-making is adopted, to dress a portion of the bricks by hand with boards called tappers, or by means of a small machine called a brick-press, of which there are many excellent ones made. The brick is placed in a metal mould, and by means of a powerful leverage is subjected to considerable pressure, which gives it a very smooth face, and produces the best front bricks. Some of these machines have single and others double moulds. I prefer the latter, as, while one brick is being pressed, the brick previously dressed is removed, and another fed in, which saves much labour and time over the single-mould press. Although these machines do not exert a tithe of the force employed by the dry clay making machines, we often see the bricks pressed by hand only, when made from plastic clays, blown to pieces, and their outer surfaces shelled off, from their not being able to be dried entirely throughout. Brick-makers should select their most loamy earths for making bricks which are afterwards to be pressed for front stocks. Pressed bricks must be thoroughly dried previously to their being placed in the kiln. A good machine produces bricks of such a quality as renders the above process unnecessary.

The drying of bricks ready for burning is a matter of great importance, and requires more attention than it generally receives. From hand-made bricks we have to evaporate some 25 per cent. of water before it is safe to burn them. In a work requiring the make of 20,000 bricks per day, we have to evaporate more than twenty tons of water every twenty-four hours. Hand-made bricks lose in drying about one-fourth of their weight, and in drying and burning about one-third. The average of machine bricks—those made of the stiff plastic clay—do not lose more than half the above amount from evaporation, and are, therefore, of much greater specific gravity than hand-made ones.

The artificial drying of bricks is carried on throughout the year uninterruptedly in sheds having the floor heated by fires; but this can only be effected in districts where coal is cheap. The floors of these sheds are a series of tunnels or flues running through the shed longitudinally. At the lower end is a pit, in which are the furnaces: the fire travels up the flues under the floor of the shed, giving off its heat by the way, and the smoke escapes at the upper end, through a series of (generally three or four) smaller chimneys or stacks. The furnace end of these flues would naturally be much more highly heated than the upper end near the chimneys. To remedy this, the floor is constructed of a greater thickness at the fire end, and gradually diminishes to within a short distance of the top. By this means, and by the assistance of dampers in the chimneys, it is kept at nearly an equal temperature throughout. Bricks that will bear rapid drying, such as are made from marly clays or very loamy or siliceous earths, will be fit for the kilns in from twelve to twenty-four hours. Before the duty was taken off bricks, much dishonesty was practised by unprincipled makers, where this drying could be carried on economically. Strong clays cannot be dried so rapidly. These sheds are generally walled round with loose bricks, stacked in between each post or pillar that supports the roof. The vapour given off from the wet bricks, rising to the roof, escapes. This system of drying is greatly in advance of that in the open air, for it produces the ware, as made, without any deterioration from bad weather; but the expense of fuel to heat these flues has restricted its use to the neighbourhood of collieries. In 1845 I turned my attention to the drying of bricks, and carried out experiments in drying the ware with the waste heat of the burning kilns. The caloric, after having passed the ware in burning, was carried up a flue raised above the floor of the shed, and gave off its spent heat for drying the ware. A model of my kiln and drying-shed was exhibited at the Royal Agricultural Society's meeting at Northampton, in 1847, by Mr. Bullock Webster, who was so pleased when witnessing it at work, that he asked my permission to have the model made to be exhibited. Although this kiln was most useful in proving that the waste heat of a burning kiln is more than sufficient to dry ware enough to fill it again, I was obliged to abandon it on account of the construction of the kiln not being good. This difficulty is now entirely removed, by a kiln which I shall have to describe presently.

Another sytem of drying is in close chambers, by means of steam, hot water, or by flues heated by fire under the chambers. I will, therefore, briefly describe the steam chamber as used by Mr. Beart. This is a square construction, or series of tunnels or chambers, built on an incline of any desired length; and at some convenient spot near the lower end is fixed a large steam-boiler, at a lower level than the drying-chamber. From the boiler the main steam-pipe is taken along the bottom or lower end of the chamber, and from this main, at right angles, run branch pipes of 4 inches diameter up the chamber, 2 feet apart, and at about 3 feet from the top or arch. From there being so close and shallow a chamber between the heating surface of the pipes and the top, and so large an amount of heating surface in the pipes, the temperature is soon considerably raised. At the top and bottom ends are shutters or lids, which open for the admission of the green ware at the upper end, and for the exit of the dry ware at the lower end of the chamber. Over the steam-pipes are fixed iron rollers, on which the trays of bricks, as brought from the machine, are placed, the insertion of one tray forcing the tray previously put in further on, assisted in its descent by the inclination of the construction. The steam being raised in the boiler, flows through the main into those branch pipes in the chamber, and from the large amount of exposed surface becomes condensed, giving off its latent heat. From the incline given to the pipes in the chamber, and from the main-pipe also having a fall towards the boiler, the whole of the warm water from the condensed steam flows to the boiler to be again raised to steam, sent up the pipes, and condensed intermittently. The steam entering at the lower end of the chamber, it is, of course, warmer than the upper end. Along the top end, or highest part of the chamber, is a series of chimneys and windguards, through which the damp vapour escapes. The bricks from the machine enter at this cooler end charged with warm vapour, and as the make proceeds, are forced down the chamber as each tray is put in. Thus, those which were first inserted, reach a drier and warmer atmosphere, and on their arrival at the lower end come out dry bricks, in about twenty-four hours, with the strongest clays. In some cases the waste steam of the working-engine is sent through these pipes and condensed. Bricks will dry soundly without cracking, &c. in these close chambers, when exposed to much greater heat than they would bear on the open flue first described, or the open air, from the circumstance of the atmosphere, although very hot, being so highly charged with vapour. In practice these steam chambers have proved many principles, but they are not likely to become universal, for they are very expensive in erection on account of the quantity of steam pipes, and involve constant expense in fuel, and require attention in the management of the steam boiler; but their greatest defect is the want of a current of hot air through the chamber to carry off the excess of vapour faster than is now done. The attaining a high degree of temperature in these chambers is useless, unless there is a current to carry off the vapour. Why should this piping be used, or steam at all, when we have a large mass of heat being constantly wasted, night and day, during the time the kilns are burning? and after the process of burning the kilns is completed, we have pure hot air flowing, from forty-eight to sixty hours, from the mass of cooling bricks in the kilns, free from

* A second paper by Mr. Humphrey Chamberlain, read at the Society of Arts.

carbon or any impurities: this could be directed through the drying-chambers, entering in one constant flow of hot dry air, and escaping in warm vapour. The waste heat during the process of burning can be taken up flues under the chamber, and thereby all the heat of our burning kilns may be economised, and a great outlay saved in steam pipes, boilers, and attention. It must not be forgotten, also, that so large an atmospheric condenser as the steam-chamber is not heated without a considerable expenditure in fuel. This drying by steam is a great stride in advance of the old flued shed, but practical men must see the immense loss incurred constantly from this source of the spent heat of the burning kilns, and that by economizing it, an immense saving will be effected in the manufacture. The kilns are constructed as near the lower end of these chambers as convenient.

A kiln for attaining the object of the one I built in 1846 is now at work at Epsom, at Mr. Hand's brick-works, but with this difference, that the smoke is consumed. The drying-shed is kept quite close, that the hot flues may raise the temperature so high as to dry the ware. In this kiln the heated gases escape from the top, after passing up through the ware, into a flue, and are carried to the ground, and thence into the drying-shed, which is a very large construction in proportion to the size of the kiln, and holds nearly sufficient ware to fill four kilns. In this shed the heat passes up a hollow wall, about 6 feet high, and after running through the length of the shed on one side, returns down a similar flue on the opposite side of the shed, and is again carried to the kiln, through the bottom of which it passes in two close flues between the three kiln-furnaces, with the exception of small apertures through which the heat enters to consume (as I am informed) the smoke; but I have not been able to see it at work, and therefore cannot speak on this point. I fear there must be a loss of heat to consume this smoke, which has travelled some 300 feet or 400 feet; this should be done in the furnace before it enters the ware, and so be economised. From these return flues the spent gases rise up a shaft at the end of the kiln. One result of carrying this return flue through the kiln, is the attaining a great draft or suction in the flues to carry off vapour. If Mr. Hands were to erect three more kilns, and so work four into his present drying-house, he could always have it highly heated, as one kiln would be burning and another cooling continually, while the other two were being respectively filled and emptied. By this means he would realise a much larger return from his spent heat. He has now to raise the temperature of the whole construction each time he burns, from that of the atmosphere to a drying heat of about 90 degrees.

The burning of bricks is exposing the clay to such a degree of heat as to change its character from a merely absorbent lump of dry earth to a hardened, indestructible, partially vitrified mass, or artificial stone, which will withstand the action of the atmosphere. The effect of fire on clays, or brick-earth, varies with the proportion and number of earths and salts of which they are composed, and the different per centage they bear one to another. Clay, or pure alumina, is infusible, but on exposure to great heat, contracts greatly in bulk. It is this property which regulates the action of Wedgwood's pyrometer. Alumina combined with silica, or alumina combined with lime, will withstand the most intense heat which can be obtained in a furnace; but if we mix these three earths, alumina, silica, and lime together, they then melt at a very low heat; the lime acting as a flux on the silica; and, according to Dr. Ure, in his "Dictionary of Arts," the more readily the nearer the mixture approaches the following proportions, viz.,—Alumina, $\frac{1}{3}$; lime, $\frac{1}{3}$; and silica, $\frac{1}{3}$: by adding two parts more of sand, it becomes infusible. The Devonshire and Dorsetshire plastic clays are composed of silica, $\frac{3}{4}$, and alumina, $\frac{1}{4}$: they burn very white, and form the basis of earthenware.

The clays and marls generally made into bricks contain protoxide of iron. If a clay has a large per-centage of iron, and a small per-centage of lime, the silica and alumina, the body of the ware, will withstand a much higher temperature than is required to flux the iron. By attaining a sufficient heat the iron melts and completely cements all the pores, giving the brick a metallic coating; so that on being immersed in water these bricks are very slightly absorbent. The bricks made from London clay, about Uxbridge, and burnt in what are called close fire-clamps, take from 10 to 15 degrees Wedgwood to burn them sufficiently hard: the fire-bricks of Stourbridge take 85 degrees; the vitrified blue bricks of Staffordshire 95 degrees; and the vitrified bricks of North Wales require 120 degrees Wedgwood, or the same heat as an iron smelting furnace. It will be seen, from what I have stated, with how varying a material we have to deal. In one case we have to attain the heat of the smelting furnace, and in another we are not much to exceed a low red heat, or the whole of the kiln or clamp would become one lump of useless slag. Clays contract in the burning as well as in drying: in order to correct this, therefore, it is desirable to work up sufficient silicates, as loam, sand, &c. with strong clays or very plastic earths. A good tile clay, that will dry and burn soundly in a thin body, or a perforated brick, will fly in the fire in so large a mass as a solid brick.

In the case of refractory clays, if, as soon as the kiln is burnt, a little common salt is thrown into the fires, from the intense heat of the interior it is immediately volatilized: the kiln then being closed up, and the fumes retained, an effect is produced on some clays of glazing the bricks, and on others of changing their colour, particularly if the clay is charged with iron, to a much darker hue, the soda acting as a flux on the iron and silica: for the effect of the chlorine we must appeal to the chemists. Stone ware, or Dorsetshire clay, takes a salt glaze. Salt must be very cautiously used, until its action on the clay is proved, for brick-earth becomes much more fusible when exposed to the vapours or gases from salt, and will be in danger of being melted. The use of sulphurous coal for brick-burning is esteemed by many makers, from the bricks having a harder appearance and better colour. The colour to which bricks are burnt, varies throughout the country. In London the white bricks are esteemed, although from the smoky atmosphere they soon obtain a different hue. Suffolk, Devonshire, Dorsetshire, Cambridgeshire, and Essex, produce white bricks of the best quality. The general colour of bricks throughout the country is red, but in Staffordshire, Shropshire, Worcestershire, and other coal districts, they are what are termed blue bricks, and are of the colour of cast-iron.

The chemical action of salts thrown into the fires of brick-kilns for the purpose of fluxing, or burning the ware at a lower temperature, or giving a better colour or appearance to the bricks, has not been sufficiently experimented on. This should be undertaken by the chemist, as the brickmaker, without his assistance, may try many useless experiments.

To explain fully the various processes of firing adopted for the different classes of earths, or more generally the different districts of the country, would occupy more time than the limits of this paper will allow. Each county adopts a distinct mode; and in some counties there are used two or three different constructions of kilns, or principles of firing the ware. I will, therefore, briefly allude to the general systems adopted, and more particularly explain those improvements which have taken place, and stood practical proof of their utility. A subject which has formed the basis of 230 patents cannot be fully explained in so brief a space. Besides this there are many improvements not protected by patents.*

Fall of Part of a Church at Derby.—On Sunday in last week the gable end of the chancel of St. Michael's Church, Derby, gave way, and the casing fell into the churchyard, shaking the fabric of the church, and spreading consternation through those assembled within its walls. The service was prematurely concluded, and the congregation, in terror and alarm, hurried out of the edifice. Fortunately no accident occurred.

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* To be continued.

PROPOSED GOVERNMENT COMPETITION.

PUBLIC OFFICES.

In pursuance of the intention of the Government to invite designs from architects of all countries for an Office for the Secretary of State for Foreign Affairs, an Office for the Secretary of State for War, and for laying out the ground between the Thames and St. James's-park, adjoining Great George-street, mentioned in our last, the Chief Commissioner of Works, Sir Benjamin Hall, invited a number of architects to meet him on Monday last at the Office of Works, that he might hear their opinion as to the particulars and instructions to competitors he proposed to issue. Mr. Hunt was with Sir Benjamin, and there were present, Sir Charles Barry, Mr. Tite, M.P.; Mr. Hardwick, Mr. Burn, Mr. John Shaw, Mr. T. H. Wyatt, Mr. M. D. Wyatt, Professor Hosking, Mr. Ferrey, Mr. Godwin, Mr. Scott, Mr. Mair, Mr. Bellamy, Mr. Pownall, Mr. Clutton, Mr. I'Anson, Mr. Poynter, Mr. Jas. Knowles, Mr. Railton, Mr. Pennethorne, and others. Mr. Sydney Smirke was prevented by indisposition from being present.

Some were there ready to protest against throwing open the competition to foreign architects, and others against any competition at all; but the Chief Commissioner informed them that these points had been settled in Parliament, and would not be opened. The proposed instructions were then read and discussed, and now stand as follow:—

"It is proposed to invite architects to offer designs for two new public offices, one for the use of the Secretary of State for Foreign Affairs, the other for the use of the Secretary of State for War. These buildings are intended to be erected on a site between Charles-street and Downing-street. The drawings are to be made to a scale of 16 feet to an inch, the plans and sections being tinted with light brown Indian ink, and the elevations in line only. Enlarged details to a scale of 4 feet to an inch, and perspective (not bird's-eye) views, tinted with light brown Indian ink, may accompany the respective designs. General specifications of the materials proposed to be used in the intended buildings must accompany each design. Lithographed plans of the site, together with particulars of the accommodation required, and the dimensions of the principal apartments, will be furnished to such architects as may apply for them.

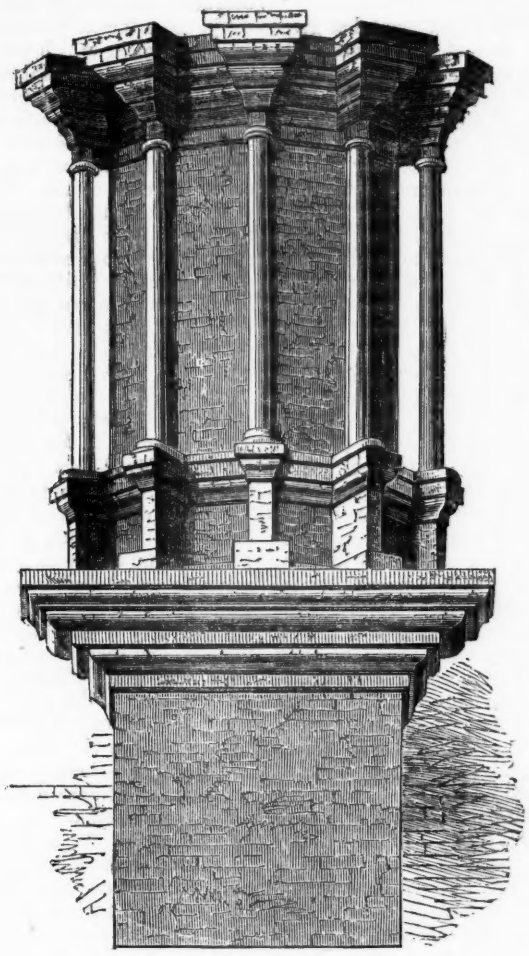
Architects are farther invited to send in a general block plan, to be drawn to a scale of 44 feet to an inch, showing how the site (lying between Whitehall on the north, Great George-street and New Palace-yard on the south, St. James's-park on the west, the river Thames on the east,—provided always that any line of embankment shall not exceed the line laid down upon the ground-plan to be furnished), may be so appropriated that the two buildings now proposed to be erected may form part of a large and comprehensive scheme for concentrating the principal public offices, and for the improvement of the leading thoroughfares, including Westminster bridge, whether as regards its present or any other site.

Premiums will be awarded to eighteen of the most successful competitors, in three classes, according to the following scale, provided the commissioners should consider the respective designs worthy of the intended rewards:—

For the best design for the War Office, a premium of	£800
Second	500
Third	400
Fourth	300
Fifth	300
Sixth	100
Seventh	100
For the best design for the Foreign Office, a premium of	£700
Second	400
Third	300
Fourth	200
Fifth	100
For the best design for a block plan, a premium of	£500
Second	200
Third	100

All designs for which premiums shall be given are to become the absolute property of the commissioners.

The designs are to be delivered to the Office of Works, London, on or before the 1st day of February, 1857. They are to be distinguished by mottoes, and to be accompanied by a sealed letter containing the



MOULDED BRICK CHIMNEY-SHAFT.

author's name and address, with a corresponding motto on the outside.

If the architect whose design for either the War Department or the Foreign Office is considered the best should be appointed to carry out the work, he will be paid five per cent. on the outlay, but in that case he will not be entitled to receive the premium."

The only change agreed to was the substitution of a scale of 16 feet to an inch for one of 10 feet to an inch and a quarter, with the view of lessening the labour of competitors. Amongst the points discussed was the nature of the tribunal and desirability of giving some information on the subject. Sir Benjamin objected to its being fixed in the first instance, but inclined to a mixed jury of professionals and amateurs, and said it was proposed to exhibit publicly all the designs in Westminster Hall *before* coming to a decision,—a very desirable arrangement. Although no pledge would be given, it was understood that the successful competitors, if competent, would be employed to carry out their designs, and would receive the usual commission of 5 per cent.

The premiums amount in the whole, it will be seen, to 5,000*l*. The amount of expenditure is left to the competitors: no estimate of cost is required. No disposition is manifested in favour of any particular style.

The course adopted, prompted by desire for expedition, can scarcely be considered the best calculated to obtain a grand whole. A design should first have been obtained for laying out the whole of the land at the disposal of the Government with reference to the various offices and buildings likely to be required; and *then* designs should have been sought for the two structures named, to occupy such positions as might be most consistent with the best distribution of the whole.

We would farther urge that more time should be allowed the competitors for the preparation of designs.

British Archæological Association.—We reserve our report of the Archæological Congress till next week.

MOULDED BRICKWORK—CHIMNEYS.

As moulded brickwork has been much talked of lately, I send you a sketch of a chimney of an old house in Blandford, which is, I think, a good specimen of moulded brickwork. The bricks are thin and well made, and the columns appear to be burnt, of the same material. The form of chimney is a decagon (on a square base), having a column at each angle. The house is one of the few which escaped when the town was nearly destroyed by fire on the 4th of June, 1731. It is the property and residence of Mr. W. C. Fincham. The sketch may possibly interest some of those who are advocates of moulded brickwork. Jas. B. Green.

STEEL AND MALLEABLE IRON MADE WITHOUT FUEL.

The iron interest has been somewhat startled and excited by the paper, read at the Cheltenham meeting of the British Association for the Advancement of Science, by Mr. H. Bessemer, "On the Manufacture of Malleable Iron and Steel without Fuel;" a discovery already tested, according to Mr. Bessemer, by experiment on a great scale. In one sense the process is not effected without fuel, because it is crude iron already melted by means of fuel that is converted into steel and soft iron; but in place of the iron being reheated, and subjected to the puddling process by means of a second application of fuel (chiefly mineral in this country), and afterwards worked up in small pellets into a malleable state, the whole furnace of melted iron is at once transferred to a second furnace, where there is no fuel for keeping it in a melted state, but where a blast of condensed air acting on the carbon in the iron itself, not only consumes that carbon, but produces such an intense heat that the metal boils with violent agitation, and the malleable iron, which is thus ultimately and rapidly made, itself arrives at a white heat, and continues in a melted state as if it were still perfectly fluid crude iron, so that even scraps of tough iron and steel are also melted in it by means of the surplus heat produced by the mere action of the oxygen of the air-blast on the carbon of the iron. Thus, in place of the immense labour and tedious delay of the puddling, hammering, and rolling processes, and the comparatively small scale on which, only, good malleable iron or steel can as yet be in this way formed, superior kinds of cast steel and malleable iron, it is said, are yielded as it were by wholesale, or on a great scale, in course of less than half an hour! with a loss of only 18 per cent. in place of 28 on the quantity of crude iron used, a large portion of this loss, moreover, being easily recoverable.

If there be no exaggeration here, the productibility of cast steel and malleable iron will now, and only now, become commensurate with the great scale on which pig-iron has heretofore been produced, and the cost of both cast steel and soft iron accordingly, as well as from saving of fuel and time, be immensely reduced.

The quality of the iron is said to be equal to that of charcoal iron, and that of the steel to be capable of being made, by a mere extension of the ingot, of a far superior quality to that which such an extension produces in blister-steel.

During the short time in which the melted metal is undergoing its fiery purification, it passes through the various states of hard and soft steel, semi-steel, and malleable and soft iron, according to the quantity of carbon consumed, so that by tapping the reservoir at different times, the different kinds of metal are at once obtained. When the metal has lost all its carbon, and is become a soft malleable iron, it is still perfectly fluid, and not a mere pasty mass, so that even then it is readily tapped and run off at once into bars, beams, or any other form, and of any dimension short of the whole quantity produced.

Since the above was written, Mr. Bessemer's magnificent discovery has been formally tested, in presence of many competent judges, and the result, in the formation of ingots of cast-steel 6 cwt. in weight, from a mass of crude iron 6 cwt. 3 qrs. 18 lbs. in weight, after less than *ten minutes boiling* and washing in its own oxide, was unanimously declared to be perfectly satisfactory. A few minutes more would have converted the steel into pure soft malleable iron. Mr. David Mushet, who appears to have seen at a glance the immense importance of Mr. Bessemer's discovery, without waiting any test of its value, declares, in the *Mining Journal*, his full "conviction that Mr. Bessemer has brought into the world one of the grandest operations ever devised in metallurgy,—a truly magnificent process," which, as he ingenuously remarks, "might easily have been predicted by any of us had our nodding and winking faculties been inspired with the wit to think to the purpose." Mr. Bessemer has been two years in maturing his great discovery; but, as scarcely ever fails in such circumstances, he is not, it appears, to be left in exclusive possession of the fruits of his genius, a Yankee patentee having already employed a patent agent to lay claim to it, on the ground that, on 15th September, 1855, he appropriated this very process to himself by patent taken out in this country. How it was that so splendid a discovery, secured so long ago by patent, was not generally heard of, or did not make itself widely known, long ere Mr. Bessemer explained his new process the other day, is not stated.

It now appears that while the Woolwich department of our own Government fatuously pooh-poohed the discovery, or "sought to throw cold water on it," as the *Times* remarks, "by alleging that Mr. Nasmyth had already made substantially the same discovery, which that gentleman has since been the first to disclaim," the French emperor to whom also Mr. Bessemer explained his process, had the penetration to appreciate its vast importance, and the disinterestedness and generosity to afford him great facilities for conducting his experiments (then in an imperfect state) to a successful result.

No discovery in the iron manufacture since Cort's, at the close of last century, has ever given such promise as this of Mr. Bessemer's. To begin with, it at once not only renders this country independent of Russia and Sweden for the finest qualities of iron,

but while these qualities are sold here at from 20*l.* to 30*l.* a ton,—by the new process iron of equal quality can be made at a cost actually 2*l.* per ton less than the present cost of common English iron! What, too, may not be anticipated from the power, thus put into our hands, of casting malleable iron beams limited, in immensity of dimensions, only, perhaps, by the limits of our mechanical or other power in transporting them from the place of their production to that of their ultimate destination!

"Cast malleable iron," says Mr. Mushet, "in the very limited scale on which it has hitherto been produced, has been characterized by excessive red-short; but on the scale of Mr. Bessemer's production this may be entirely altered, or successfully removed. The economic basis he has fixed is so broad that there is room to rear any amount of superstructure. The success of the new process will re-act upon the management of the blast-furnace, and render unnecessary the present wasteful system of manufacturing forge-iron for the puddling furnace. This and the refining will be superseded with a vast economy in all branches of the manufacture. After seventy years' use, one of the inventions which has made Britain great is threatened with antiquation, but the grooved roller is likely to remain a little longer. Mr. Bessemer has, I think, invented something *equally calculated to stimulate the passions and the devices of the base, the mercenary, and the ungrateful.* This discovery throws distinctive light upon many details of the blast-furnace, well known, but never rightly understood; but space will not now permit a reference to them. I know nothing," he adds, "of Mr. Bessemer except his name, his centrifugal pump, and now this gigantic cupel, but I am always eager to express my sense of great merit. Besides the enormous capacity of his process for the manufacture of iron and steel, he has realized a method for effecting a working temperature infinitely exceeding what has ever yet been attained in the arts, except by intense electro-chemical currents; and it is impossible to foresee what may be the range of ultimate and general consequences from this invention."

PROVINCIAL NEWS.

Great Grimsby.—The Corn Exchange is nearly completed. The body of the building is of red and white brick. The tower is of stonework. The cost, with site, will be about 9,000*l.* to be paid off in thirty years by instalments.

Alford.—The erection of the Corn Exchange here has commenced on the site of premises which have been pulled down in the market-place.

Lynn.—The Norfolk estuary works, which have been stopped for some time, in consequence of the want of clay for the training banks, have been recommenced, a supply of material having been found in the old channel.——The materials of the old workhouse, with the land on which it stands, containing about three roods, were put up to auction on Tuesday in last week. The reserve was fixed at 1,400*l.* but the highest bidding was only 1,130*l.* and no sale was effected. A strong competition, according to the *Norfolk Chronicle*, was expected for this site, which is situated in the best part of the town.

Newbury.—It is in contemplation to make a new road from the bridge into the market-place. A correspondent of the *Reading Mercury*, who approves of the proposal, states, however, that while the plan, from destroying six houses, would cost 6,500*l.* another which he suggests would only cost 4,000*l.* including the re-erection on an eligible site of the mansion-house, with wings in Crystal-palace form for a corn-exchange: by this plan, he says, only two houses, the *Newbury Herald* and *Reading Mercury* offices and another (both in the centre of the Market-place) would require to be removed.

Horley.—The first stone of Burstow Hall, the mansion of Mr. Francis Kearsey, between the Horley and Three Bridges stations, on the London and Brighton Railway, was laid on Tuesday before last by his son. The mansion will be built in the Italian style of architecture after a design of Mr. H. Flower, of London, architect.

Frome.—The inconvenience so long felt in this place, for want of suitable accommodation, is likely soon to be remedied, by the erection of a market-house. A convenient site has been purchased, and the building is to be commenced forthwith, chiefly, it is said, at the expense of the Earl of Cork.

Devonport.—The War Department has given Mr. G. Roach the contract for erecting the north wing of the new barracks at Devonport, the cost of which is estimated at 56,000*l.* The buildings in the Ligonier and Frederick squares, and the Picquet stables, will be taken down, and the whole of the materials sold by auction. It is also intended by the Government to appropriate a portion of George's-square for the erection of barracks for married men, the contract for building which will soon be made public. The old barracks will be taken down, and a considerable portion of the site will be thrown into the Mount Wise parade. When the barracks are fully completed, including the Royal Marine Corps, Artillery, &c. the garrison, it is said, will accommodate about 7,000 troops.

Alvechurch.—On the 7th inst. the corner-stone of new national schools for the parish of Alvechurch, designed by Mr. Butterfield, who is also the architect of the new rectory just completed, was laid. The site is in the neighbourhood of the church and the new rectory. On the completion of the new schools it is hoped that sufficient funds will be raised for the restoration of the parish church, which has suffered much from neglect and mutilation.

Manchester.—The extensive range of buildings erected for the new Manchester workhouse at Crumpstall will probably be ready for occupation in March next, according to the *Courier*. The building will accommodate 1,700 persons, and measures about 700 feet long by 400 feet broad. The works are under the supervision of Messrs. Mills and Murgatroyd, the architects. A stone entrance marks the front of the building. No steps have yet been taken relative to the supply of water; and it is not decided whether to bore for it, in which case it is believed an abundant supply would be obtained, or use the equally abundant corporation water, which would have to be brought upon the ground. Pipes are being laid for both water and gas: the fittings of the latter are done by Messrs. Owen and Robinson, Manchester. No disturbance has resulted from the bricksetters' labourers since the outbreak which consigned several of them to the assizes. The cost of the entire building will be about 50,000*l.* A considerable portion of the land will be devoted to "test" labour. The test for women will be in the wash-house and laundry, which are very extensive. The able-bodied will thus earn their living. There will be schools and playgrounds for boys and girls, and workshops for teaching trades to the boys, as well as for teaching the girls the occupations suited to their age and sex. There are also imbecile wards, an infirmary, &c.——The corporation workmen, under the direction of the improvement committee, Mr. Shorland, the city surveyor, and Mr. Langtry, the surveyor of Chorlton, have commenced widening Oxford-street, an improvement long contemplated and much needed. In the narrowest part it is only 12½ yards wide: when the improvement is effected, there will be a general width of at least 20 yards.

Stockport.—The internal arrangements of the grammar-school have undergone extensive revision and improvement, under the suggestions of the architect, Mr. Hardwick, of London, the stonework having been executed by Mr. S. Bann, and the brickwork by Mr. Barlow, both of Stockport.

Oldham.—The new building for the Oldham Lyceum, at the corner of Clegg-street and Union-street, is to be publicly opened on the 22nd of next month. The building has two entrances, the principal one being in Union-street, which opens into a large entrance-hall, the most prominent object on entering which will be a window of stained glass opposite the entrance and above the first landing on the staircase. The window bears representations of science, art, history, and fame, and is the work of the St. Helen's Plate-glass Company. The basement floor contains two class-rooms, 14 yards by 9. The news-room on the ground-floor is 14 yards by 9, lighted by five windows, and two eight-light chandeliers. The reading-room, on the same floor, is 9 yards square, and is lighted with three windows fronting Union-street. Behind this room is the library, 5 yards by 9. From the hall, two broad flights of steps, boarded with African oak, lead to the second story, the principal room on which is the theatre or lecture-room, which will accommodate about 300 persons. It is lighted by eight windows, and the roof is ornamented and panelled. In the evening the room will be lighted with a sun-burner. The board-room is situated on the centre of the landing, and to the left there are coffee and class rooms. There is a third story at the back of the building, in which there are two rooms: the first, 10 yards by 5, is to be appropriated to discussion and music classes; and the other, which is 9 yards by 6, and is lighted from the roof, for a drawing-class. There is an apartment with a glass roof, adapted for a photographic class, and a fire-proof room for a laboratory. From the photographic class-room a stair leads to the roof of the building, where a considerable space is flagged and walled round, and is intended to be used as an observatory, for which Mr. James Platt, the president of the institution, has presented a telescope. A railing of a design furnished by the Thorncliffe Ironworks Company, near Sheffield, will be placed round the outside of the building. The windows are of plate-glass, from the St. Helen's Plate-glass Company. Connected with the institution is a dwelling-house for the superintendent, and there are separate play-grounds for boys' and girls' classes. Mr. Pennington, of Manchester, is the architect for the building; and the whole of the works are contracted for by Mr. George Whittaker, of Oldham, builder.

Edinburgh.—Among other improvements in progress at Holyrood Palace, the throne-room on the south side of the quadrangle has had a new ceiling of the style of sixteenth century. The throne-room measures about 70 feet by 30, and the surface of ceiling is intersected by moulded ribs, forming panels alternately square and circular, which contain heraldic devices modelled in relief. Besides the heraldic devices, there are numerous other decorations consisting of the fleur-de-lis, rosettes, pendants, &c. the whole being supported by a cornice, enriched with a wreath of rose, thistle, and shamrock intertwined. The old windows are being replaced by new ones of plate-glass, in a style to correspond with those in the other State apartments. The new drive from Abbey-hill to the Queen's Park, passing in front of Holyrood Palace, is now almost completed. An improvement is being made on the drive at the east end of the Duke's Walk, where the line is being diverted to the northward so as to avoid the acute angle at the corner of Parsons-green.

Glasgow.—The foundation-stone of the new Free College and Church was laid on Monday in last week. The buildings are in progress.

St. Andrew's.—Upwards of 1,700*l.* have been subscribed for the erection of a new Town-hall in St. Andrew's.

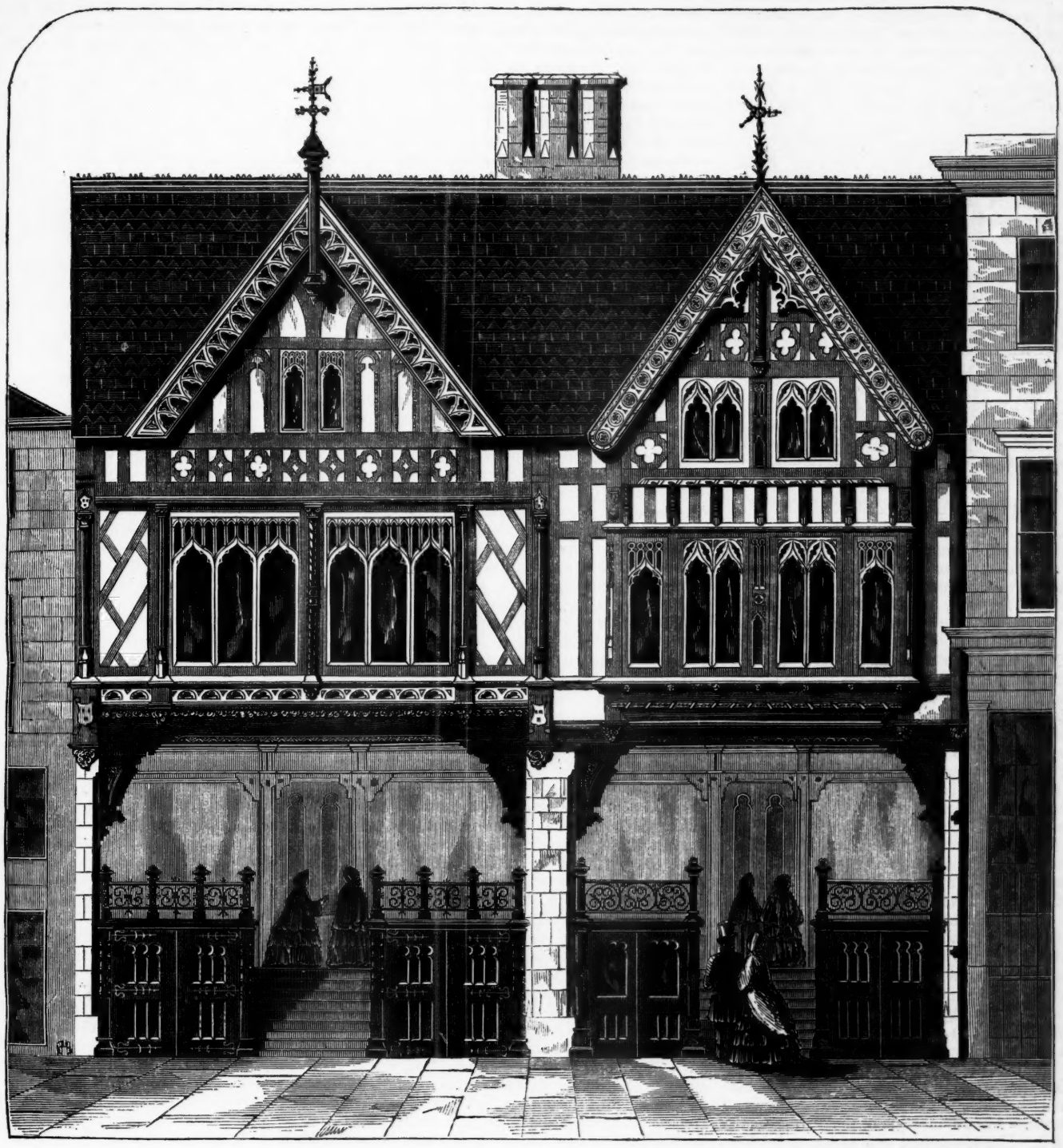
Londonderry.—The foundation-stone of the Magee College was laid on Monday in last week. Mr. M'Clelland is the contractor, and has engaged about 100 men on the work, whom he has just entertained in a pavilion erected on the grounds.

Drogheda.—A meeting of the inhabitants of Drogheda was held on Monday before last, in the Tholsel, convened by the Mayor, at the request of nearly 200 ratepayers, to adopt measures for erecting two draw-bridges over the Boyne, and to remove all obstructions to the free navigation of the river. Resolutions favourable to the object of the meeting were passed.

SMOKY BRICKS.

My house was built about twenty years ago with bricks from half a dozen houses 150 or 200 years old. The dirt from the old bricks eats through the plastering in my two best rooms, spoiling the paper in about four months, in patches as if the walls were damp, which can hardly be, as the house is cemented outside. Will you please to say, in your next *Builder*, if you can recommend any method for preventing this? I have thought of knocking off the present plaster, then nailing slate laths, upright, against the wall, and lathing and plastering upon them, but should rather, if possible, save that expense and trouble. If you can help me out of my difficulty, I shall feel particularly obliged and grateful. G.

*** Thin sheet-lead, or tin-foil, may be applied advantageously.



NEW HOUSES IN "THE ROWS," AT CHESTER.——Mr. T. Mainwaring Penson, Architect.

NEW HOUSES IN "THE ROWS," AT CHESTER.

No one forgets Chester who has once seen it, with its peculiarly arranged streets, with a public way beneath the first floor of the houses, its ancient walls and red sandstone churches. In respect of its streets, the "Rows" as they are termed, Chester is unique in England, and all who love picturesque effects, and would retain ancient characteristics, will desire that these should not be interfered with. The substitution of ugly brick fronts and sash windows for the old gables wherever repair or alteration has become necessary, has done much injury to the appearance of the streets, and should not be encouraged. We are glad, therefore, to see that in two fronts recently put up under the direction of Mr. T. Mainwaring Penson, the old style has been adhered to, and with good effect. We have engraved a view of them to mark approval of the course pursued. Provision is needed for the eye and mind as well as for the body.

THE ROYAL MONUMENTS IN WESTMINSTER ABBEY.

It will be recollected by most of our readers that owing to a memorial addressed to her Majesty by the Institute of British Architects, Mr. Scott, as architect to the Abbey, was requested by Sir W. Molesworth to report upon the condition of the royal monuments which it contains. His report represented, in strong terms, the mouldering condition of the stone, both Purbeck marble and firestone; and urged that some course should immediately be taken for their preservation, and suggesting a certain degree of partial restoration. The different Antiquarian Societies strongly objecting to restoration, Mr. Scott turned his thoughts to the question of whether some process could not be found by which they could, as it were, be *stereotyped* in their present state, and secured from farther decay. After several means being considered, and some experiments being tried, the following mode of operation was hit upon: a very weak resinous solution in spirits of wine is injected upon the decayed surface by means of a gardener's syringe, the end of which is perforated with numerous fine holes. The small streams from these minute orifices have not strength sufficient to remove the loose scales which hung upon the surface, and which were so tender that the slightest touch of the finger or a brush would cause them to drop. The solution is made in the first instance exceedingly weak, so as to soak, even into the Purbeck marble, as far as the decay has penetrated. The operation is repeated at intervals of a day or two, till the pores are perfectly saturated; and the solution is made somewhat stronger as the work proceeds. The number of coats or applications varies from four to six. And an injection of pure spirits is used at the close to take off any gloss which may appear upon the surface; and, finally, such parts as have scaled off to such an extent that the solution will not secure them, are firmly re-attached by strong shell-lac cement, applied with a pencil. The process has been applied to all the monuments of Purbeck marble or firestone which surround the chapel of the Confessor, including also his shrine, and with every appearance of perfect success. The surface, instead of being loose

and powdery, so that the slightest touch of the finger or the dress brought it off in dust, or larger fragments, is now hard and firm, while the venerable tone of colour—the peculiar charm of these monuments—is scarcely perceptibly altered. We heartily rejoice in this result, which will be hailed, we trust, with satisfaction, both by those who favour and those who discountenance restoration. The only restorations effected to the royal tombs, all of which are mainly due to Mr. Scott, and some of which we have before noticed, are the refixing of the iron screens to the monuments of King Edward V. and Queen Eleanor; the restoration to their places of some portions of the tabernacle work to that of Queen Philippa (portions of which had been for many years in a private collection); the restoration to its place of one of the spiral columns to that of King Henry III. which had been broken and removed; and the restoration of a similar column to the shrine of the Confessor: the fragments were found in the triforium, and have been carefully put together, and will shortly be fixed in their place. The recent works have been executed by Mr. Poole, of Westminster.

CHURCH-BUILDING NEWS.

Lincoln.—A stained-glass window in memory of Sir Richard Armstrong, has been added to the three lately placed in the aisle on the south of the nave of Lincoln Cathedral. The artist was Mr. Edgland, of London. The subject, portrayed in four separate groups, is from the life of David, illustrating 1 Sam. xvii. 54, 1 Sam. xx. 41, and 2 Sam. xxiv. 25, surmounted by King David on his throne playing a harp.

Bury.—Excavations are being made for the foundations of the proposed new church, in St. Mary's parish, to be called St. Peter's. The site is in Union-terrace. The style to be adopted in the building is of an early date, and the designs are by Mr. Hakewell. The funds have been placed in the hands of the incumbent of St. Mary's anonymously, and the site has been secured from the Marquis of Bristol.

Rougham.—The *Bury Post* states that the works which have been in progress for some time at Rougham Church are now brought to a close. The roofs have been repaired and made secure, and the interior has undergone a complete renovation—the stonework of the arches, pillars, windows, &c. having been divested of coatings of whitewash, cleaned and restored, and the walls restuccoed. The nave and aisles are now fitted up with oak benches, having carved poppy-heads and tracery panelled ends, varied in detail, corresponding with the old benches, which have been repaired and cleaned. All are in style of the Perpendicular period. The tower (the arch of which has been thrown open to the nave), is fitted up with oak benches, the gift of Miss Colvile, for the school children. Various other minor improvements have been effected. The works have been carried out under the direction of Mr. Johnson, of Bury, architect, by Mr. Rednall, jun. of Woolpit, the contractor. The total expense is about 800*l.*

West-Ham.—The works at the cemetery for West Ham parish, will shortly commence, the contracts for the erection of the chapels and other buildings having been entered into by the West Ham Burial Board, pursuant to the Burial Board Acts. The land is situate in Forest-gate-lane, contiguous to the Whitechapel Industrial Schools, and about equidistant from Church-street, Stratford, and Plaistow wards.

Basingstoke. — At a meeting of the local Burial Board, held on Monday in last week, it was resolved, says the *Reading Mercury*, that Messrs. Poulton and Woodman, of Reading, who obtained the first premium for the designs for the cemetery, should be appointed the architects for the requisite buildings, and that advertisements for contracts should be inserted in the *Builder*, and the various local papers. At same meeting it was also resolved that a loan of 3,500*l.* be negotiated on the rates and borough fund. Mr. Grainger, inspector of burial grounds, has seen and approved of the site for the burial ground.

Oxford.—The tower of St. Mary's Church, which some time ago was considered to be in an insecure state, by the giving way of the lower part, has been strengthened, under the direction of Mr. Scott, the architect, by the insertion of a number of iron bolts, about twenty-four of which pass through the building, and are fastened by ornamental nuts on the opposite side. The buttresses are also secured by bolts, which are fastened in the interior of the church, and the general stability of the spire is increased by the building up with solid work two staircases on each side. The number of bolts altogether is about sixty.

Whitchurch.—The parish church of Whitchurch, Oxon, is now found to be unequal in accommodation to the wants of the parishioners, and it is proposed to build a new aisle, and arrange the seats in the body of the church for the better accommodation of the congregation. Between 1,400*l.* and 1,500*l.* will be required.

Luton.—The foundation-stone of a new church has been laid at Luton by Mrs. Crawley. The site of the new edifice, which is to be named Christ Church, is on the right of the Dunstable-road, about midway between the Town-hall and the point where the Luton, Dunstable, and Welwyn Railway will cross the main road. The church, which will stand east and west, is to be built in the style of the transition from the Early English to the Geometrical period; and will consist of a nave, north aisle, north and south transepts, and chancel, with small vestry attached. The church will be built of red bricks with bands and crosses of black vitrified bricks, and Bath stone dressings from the Corsham Down quarries: the quoins will be in white bricks from the Arlsey grounds: the roof will be covered with Bangor countess slates, laid in alternate rows of blue and green. At the south-west angle of the nave there will be a small turret springing out of the buttresses, with trefoil-headed arches and small shafts, supporting a shingle spire. A cross will surmount the west end of the nave. There will be three entrances to the church, the principal at the west end, and two on the south side. At the west end there will be a large five-light trefoil-headed window: on the south side the windows will be two-light, with polygonal perforations above. The transepts and chancel will have single-light trefoil-headed windows, with rose windows in the gables; and the aisles and sides of the transepts, polygonal cusp windows. The chancel window will be in stained glass. The chancel will be divided from the nave by an acutely pointed arch, springing from ornamented carved corbels; and under the wall-plate of the chancel roof there will be a course of Minton's encaustic tiles. The nave will be divided into four bays, with pointed arches, springing from octagonal shafts. The interior roof will be composed of rafters, with cross braces, springing from and covered with boarding, laid diagonally, and stained and varnished. The chancel roof will be composed of rafters and moulded purlins, with lath and plaster between the rafters, coloured a deep blue. The font and pulpit will be executed in Caen stone. There will be stalls of an ornamental character in the chancel; and the seats, which are to be open, will be of deal, stained and varnished, with ornamental bench-ends of quatrefoil panels. The church will seat 700 persons, inclusive of 100 children; and the estimated cost of its construction is 1,750*l.* It will be heated with hot water by the apparatus of Mr. Scott, of Greenwich. The architect is Mr. H. Elliott, of Dunstable; and the builder, Mr. Robert Greig, of Pimlico.

Portswood and Highfield.—The *Hampshire Independent* states that the addition which has been made to Christ Church, Portswood, by Mr. Chinnock, builder, under the superintendence of Mr. Eiliott, architect, was opened on Monday before last for divine worship. This enlargement will afford 300 additional sittings, more than half of which are appropriated for the poor of this rapidly-increasing district.

Winchester.—The tower of St. Thomas's Church here is nearly up to the point at which the spire commences. The new windows of the tower give a different character to the building.

Sherborne.—A vestry was held at the town-hall, on Thursday in last week, to consider the propriety of reopening the west door of the abbey church of St. Mary. When this church was partly under restoration, some five years since, it was thought advisable by the architect, Mr. Carpenter, to close these doors, which was accordingly done, leaving a blank wall as the result. Mr. Slater, the present architect, said, in reply to an inquiry, he thought it would be most desirable that the west door should be opened as a western entrance. Some alterations required would probably cost about 25*l.* exclusive of the masonry work, which would cost about the same amount. It was resolved that the west door of the church be reopened, at a cost not exceeding 60*l.*

Knaresborough.—The consecration of Trinity Church, Knaresborough, took place on Monday in last week. The first stone of the new edifice was laid on the 8th of August, 1854. The church is built on the south-west side of Windsor-lane, on a plot of land given by Sir Charles Slingsby. It is calculated to accommodate 800 persons.

Bristol.—A painted window, in the Early English style, has just been placed in St. Peter's Church, by Mr. Pearce, of Stoke's-croft. St. Peter's has been lighted by gas by Messrs. Hale and Co. of this city.

Oswestry.—The celebration of the completion of the new church tower, Llanyblodwel, took place on Thursday in week before last, when the Gothic tower and spire were completed. This structure is the gift of the Rev. J. Parker, the vicar. The design was from the same gentleman. The church needs repewing.

Llanedwen (*Anglesey*).—The old church in the chapelry of Llanedwen having become so dilapidated that it was unfit for the celebration of Divine service, and not worth restoring, a new edifice has been erected on the same site, from designs by Mr. H. Kennedy, of Bangor, architect; Mr. Ebenezer Thomas, Menai-bridge, being the contractor. It is built in the Perpendicular style, and consists simply of a nave and chancel, with roof of open frame timber work, the old oak principals being restored. The seats are all free, and calculated to accommodate from 200 to 300 persons. The materials used consist of blue rubble stone, Stourton-hill stone being used for the dressings of the doors, windows, and buttresses, and also of the spire. The church is situated on a gently rising ground, at a short distance from the shore, facing Port Dinorwic. There are two memorial windows of stained glass, to members of the Plas Coch family, one being in the chancel, and consisting of three lights; the other on the north side of the pulpit, which, with the reading-desk, is of oak, and foliated. The cost has been principally borne by the landed proprietors of the parish.

Llandudno.—Divine service was celebrated on Sunday evening at the ancient church of St. Tudno, on the Great Orme's Head, lately restored for Mr. Reece.

Nottingham.—A new Congregational church for the parish of Sneinton, at Nottingham, was opened on Thursday before last. It is built after a plan by Mr. Thomas Oliver, jun. of Sunderland, architect.

Doncaster.—At the beginning of the year, says the local *Gazette*, we stated that it was the intention of Mrs. Saunders, of Hall-gate, to place a memorial window in the west end of the south aisle of the parish church, to the memory of the Elston and Saunders families; and that the design had been entrusted to Mons. Capronnier, Rue de Brabant, Brussels. Since then we find that this benevolent lady has expressed a wish to have the window facing the north aisle also filled with stained glass, and in perfect keeping with the one already mentioned. The principal figures will represent Charity in all her attributes. Mr. Wailes, of Newcastle, has been entrusted with the design for the windows intended for Forman's chapel. The drawings will be specially provided for him, under the direction of an artist, and approved of by Mr. Forman and Mr. Scott.

Huddersfield.—On Thursday in last week St. Paul's Church, Huddersfield, was reopened. About 300 guineas have been expended in renewing the floor, which was very much decayed, and in rearranging the pews.

South Stockton.—A subscription has been commenced for the purpose of building a church

in South Stockton. A site has been offered gratuitously, and it is hoped means will soon be found to raise the building.

Scarborough.—Several alterations and improvements have lately been made in the parish church of Scalby, part of the church having been taken down and rebuilt, and the interior repaired. At the eastern end of the chancel is a window of stained glass, containing three lights, representing respectively figures of "The Baptism," "The Last Supper," and "The Crucifixion of Christ." This window is the gift of Mrs. Betsey Hardcastle, of Scalby Villa, in memory of her deceased husband. These improvements have been carried out under the direction of Mr. Petch, of Scarborough, architect. Other alterations of a more extensive character are contemplated.

Glasgow. — Claremont church, erected at the West End by members of the United Presbyterian body in this city, was recently opened for public worship. The church consists of nave and aisles with clerestory measuring 100 feet from north to south, and 70 feet from east to west, with its west front to Claremont-street, and the north or entrance front to the New Park. The windows of the aisles are gabled into the roof, and divided by mullions into three lights or bays branching into flowing tracery in the pointed tops. On the east and west sides are doorways with segment-headed arches, moulded and enriched with detached flowers in the mouldings leading to the staircases and main porch. The south gable fronting the mews lane is filled in with two-light windows and traceried heads, and the five-light window of the nave, with symbolic tracery. The north, or grand entrance, fronting the park, has a doorway flanked with triple buttresses running into octagonal pinnacles. Over the door is a four-light window inferior to that at the south end, and there are two-light windows at the end of the aisles filled in with tracery and traceried panels at the foot of all these windows. The door is yet to be covered with floriated iron work. The pewing is all of simple design, cushioned with crimson-covered hair-cushions. Something like 20 per cent. more space is allowed for each sitter than generally allowed in Scotland. The gallery is carried round the two aisles and across the north end of the nave, supported on bronzed pillars, disengaged from the pillars of the arcade. The panels of the front are filled in with traceried work. The church is seated for 1,180; but, had the pews been the usual width, it would have accommodated 1,400. Underneath the church is a hall, to accommodate 400 Sunday scholars, or prayer meetings, lectures, &c.; besides a session-house, with the church-officer's apartments, heating-chambers, vaults, closets, lavatories, &c. The building is enclosed with a railing of ecclesiastical design. The entire cost of the building, exclusive of the land, and including the stained windows, cushions, gas-fittings, &c. is considerably under 7,000*l.* The mason work has been executed by Mr. Allan Craig; the wright work by Mr. James Russell; the plumber work by Messrs. Leadbetter and Son; the plaster work by Mr. John Craig; the slater work by Mr. Anderson, Greenock; the painter work by Mr. Graham, of Stirling; the glazier work by Mr. Watson, of Dunfermline; the painted windows by Mr. Ballantyne, of Edinburgh, and Mr. Cairney, of Glasgow; the stone-carving by Mr. James Crawford; the upholstery by Mr. Goldie. The architects are Messrs. Hay, of Liverpool.

FOREIGN INTELLIGENCE.

Kaulbach and the German Museum. — The ancient mural paintings lately discovered in the Town-hall of Nuremberg, have been now cleaned and copied in their natural size, by M. Eberlim, who has already completed those of the inside of the hall and the outer wall of the pediment. This has been done at the expense of the German Museum, and the fine group of musicians has been lithographed for being painted, and privately distributed, with an explanatory text, amongst friends and patrons. Although Nuremberg has possessed many great painters, it is not rich in mural paintings. The more pleasing is it to hear that Kaulbach has offered to adorn one of the walls of the *Karthause* with a mural painting, and there is, no doubt, that such an example will be followed by many other artists of distinction.

Potable Water. — M. Darcy, of Dijon, has published a work, entitled "Les Fontaines Publiques" (the public fountains of the city of Dijon), which discusses the important question of *drink* water in large towns. It is so far back as the earlier days of Arago and Brougham that the great sanitary importance of potable water for large cities was recognised. M. Darcy has repeated these assertions, and has, moreover, furnished a monography of all the *public fountains* and the various borings and aqueducts of Dijon, which shows what strenuous exertions are made even by small communities for the welfare of their citizens.

The amount of gold exported from Australia, since its first finding in 1851, has been 46,000,000*l.* sterling, of which seven millions have been from New South Wales, and thirty-nine millions from Victoria. It appears, farther, that the amount of gold found in Victoria has been nearly the same during the last four years, but has considerably decreased of late in New South Wales.

The Salubrification of Paris on a new System, &c. (*Paris*, 1856, 8*vo.*)—Notwithstanding the great efforts made for the salubrity of Paris, still no one can pass even the best quarters in the evening hours, during the warm season, without finding himself unpleasantly affected by the smell emanating from the *égouts* of the paving. In Paris, it seems, all the waste water of the households has to take its course in the streets, &c. Thence M. Allain proposes that it should be carried off at once to the greatest depth possible. Now already two large sewers, built on both banks of the Seine, receive those impurities which formerly polluted the waters of the river. The owners of the new streets of Rivoli and Strasburg are bound to have both an ample supply of water and a subterraneous drainage.

Benevento: the Triumphal Arch of Trajan.—The Papal Government have purchased the houses which have been plastered up at both sides of Trajan's Arch, in order to demolish them. The fine basso-relievos, which seem well preserved, will, therefore, come to light, after centuries of concealment. As there will be a place opened around the arch, it will assume the appearance it had in the Roman period. It is time now that this splendid monument should be properly designed, as there exists no good engraving of it. There is at Benevento also the church of Sta. Sophia, a diminutive specimen of its great prototype. It was executed by a Greek architect under Gisulph III. a Longobard king of Benevento. It will next claim the restorative care of the Papal authorities.

THE TUMULI AT KERTCH, IN THE CRIMEA.

Dr. Duncan Macpherson in his paper read at Cheltenham, illustrative of his researches in the Crimea, said,—The present town of Kertch is built close to the site where 500 years before Christ the Milesians, who were of the family of Ionians, formed a colony and founded the city of Panticapæum. The colony of Cherson, near Inkermann, was founded about the same period by the Dorians, a people at rivalry with those of the colony of Miletus. History records that the race denominated the Cimmerians originally inhabited this locality, and that the Tauri, a savage and cruel people, who made offerings and feasts of human victims, and whose dwellings cut out of the solid rock are still seen around Kertch, succeeded them. The Scythians who appear to have descended from the mountains of Thibet in Tartary, and were probably the ancestors of the present race of Tartars, conquered the Tauri, and became the Tauro-Scythians. Crossing from Pontus, where they held sway, the Milesians expelled the Scythians and founded a kingdom, which, from the salubrity of its climate, the fertility of its soil, and the industrious habits of the colonists, speedily arose in its prosperity and became, in its palmiest days, the granary of Athens. They dedicated their new city to the sylvan god Pan: because of the abundance of the wine found, the worship of Bacchus became very general among them, and they called the chief city of this colony Panticapæum. The characteristic features around Kertch are the immense tumuli, or artificial mounds, that abound in this locality, more especially in the second vallum. These sepulchres of the ancient world are found in many places. They are in the form of barrows in England, and cairns in Scotland. Calculated as they are for almost endless duration, they present the simplest and sublimest monuments that could have been raised over the dead. The size and grandeur of the tumuli found in the neighbourhood of Kertch excite astonishing ideas of the wealth and power of the people by whom they were erected, for the labour must have been prodigious and the expenditure enormous. Specimens of the highest Hellenic art have been discovered in these tumuli, such as sculptures, metal, alabaster, Etruscan vases, glass vessels remarkable for their lightness, carved ivory, coins peculiarly pleasing on account of their sharpness and finish, and trinkets executed with a skill that would vie with that of our best workmen. All originals were forwarded to the Hermitage at St. Petersburgh, duplicates being preserved in the Museum at Kertch, and these might have been easily secured to England on the investment of the place by the Allies, but, with the exception of some bas-reliefs which, in connection with two other officers, Dr. Macpherson transmitted to the British Museum, the whole of these rare treasures were barbarously made away with. The local tradition is, that these tumuli were raised over the remains and were intended to perpetuate the memory of the kings or rulers who held sway over the colonists, and that the earth was heaped upon them annually on the anniversary of the prince's birth, and for a period of years corresponding to those in which its tenant had held rank or reigned; and to this day the successive layers of earth which were laid on each succeeding year can be traced, a thin coating of sea-shell or charcoal having been first put down. Dr. Macpherson counted as many as thirty layers in a scarp made in one of these mounds about two-thirds from its base. They are to be seen of all sizes, varying from 10 to 300 feet in circumference, and in height from 5 feet to 150, and are usually composed of surface soil and rubble masonry. Herodotus's reference to these sepulchres is the earliest account which history has recorded of this mode of burial, and the attention of the meeting was particularly drawn to his description of the mode adopted to perpetuate the memory of their deceased princes, as it would be seen that one of the excavations to be referred to corresponded exactly with the description given by him. "The tombs of the Scythian kings," he states, "are seen in the land of Sberri, at the extreme point to which the Borysthenes is navigable. Here, in the event of a king's decease, after embalming the body they convey it to some neighbouring Scythian nation. The people receive the royal corpse and convey it to another province of his dominions, and when they have conveyed it through all the provinces, they dig a deep square foss, and place the body in the grave on a bed of grass. In the vacant space around the body in the fosse they now lay one of the king's concubines, whom they strangle for the purpose, his cupbearer, his cook, his groom, his page, his messenger, fifty of his slaves, some horses, and samples of all his things. Having so done, all fall to work throwing up an immense mound, striving and vieing with one another who shall do the most." The Greeks, who always respected the religion of the countries they had conquered, and who, in process of time, imbibed to a certain extent their customs and observances, appear to have adopted this Scythian mode of burial. Instead, however, of placing their magistrates or rulers in "a deep, square fosse," dug in the earth, they built tombs, and over these raised the conical hill. All, or nearly all, of these tumuli have been examined. The Genoese explored the largest and most valuable, and the Russian Government have also carried on explorations with much success. Selecting those which promised best, assisted by Major Crease, Royal Engineers, Dr. Macpherson carefully explored these tumuli. In some the tomb was found above the natural surface, and in some beneath it. Some were arched in the Egyptian, others in the modern style. Square flags, resting on each other in the centre, and supported by a niche in the side wall, supported a few: others had flat roofs, while occasionally no masonry was discovered. Fragments of bracelets, which were exhibited in the room, were found in one of the tumuli. Having descended many feet under the natural surface, he came upon the bed of ashes. The bones of a horse, a human skeleton, and other remains were also met with; and on removing the masonry, fibulæ and bronze coins were picked up in niches between the stones. Having worked at this tumuli for two months without success, he turned his attention to Mons Mithridates. The whole of this hill, from its base to its summit, and the spur extending from it to a distance of three miles, is composed of broken pottery and *débris* of every description to a depth of from 10 feet to 100 feet over the natural clay hill. The height and size of this Milesian work are so enormous, that it is scarcely possible to believe it to be the result of

human labour; and it must have been the work of ages to have conveyed the surface soil from the plains below, to raise it and the neighbouring heights to the present elevation. On the top of this hill is a rude chair, cut out of the rock, and a hollow resembling a sacrificial altar.

INTERDICTION OF PORTICOES IN LONDON.

THE BOARD OF WORKS.

As the architect of works now in progress at No. 30, Grosvenor-street, I consider it my duty to ask you to direct the attention of the profession to the proceedings of the Metropolitan Board of Works, on their last meeting at Guildhall, as reported in the *Daily News* on the 16th inst. and the *Observer* on the 17th inst.

A portico was wished for by the owner of the residence referred to, and after a delay of upwards of three months (arising from a portion of the property being held in trust), the *written consent* of the adjoining owners was obtained, in accordance with the printed instructions of the Metropolitan Board of Works. The design received the approval and recommendation of their superintending architect, and the district surveyor sanctioned its being erected; but the Board of Works decided, by a small majority, against its being erected, not from any objection to the design or mode of construction, but partly on "sanitary grounds," arguing that porticoes are an obstruction to light and air, and partly because the District Board of St. George's, Hanover-square, had objected to them. I find that so far from the Metropolitan Building Act interdicting the erection of porticoes, the 26th section shows that the continuance of such erections for the future was contemplated and expected by the framers of the Act. If, without consulting the public or the profession, this decision of the Metropolitan Board of Works, that for sanitary (!) improvement, porticoes hereafter must not be built in London, is to become the law, I, of course, must submit to this decision. If it were simply a question as to site, I might respectfully urge that few situations in London are more appropriate.

Independently of architectural effect, a portico in a climate like ours becomes a most useful addition to a dwelling, and also it frequently affords shelter to the public. It appears to me that the question whether we are to have porticoes or not in London should be at once definitely settled: it is one of great importance to the architects of London, and I think it is incumbent upon them to take some steps towards remedying what appears likely to become a great evil; for, in the exercise of their profession, they may be induced to comply with the instructions issued by the Metropolitan Board to prepare, as I have done, a block plan of the neighbourhood, showing the various projections in the immediate locality; to make drawings, and obtain the consent of the adjoining owners; pay professional fees for reporting thereon; and probably, as in my case, solicitors' charges also; and after taking every possible pains to comply with the conditions required under the 26th section of the Building Act, and sec. 143 of the Metropolis Local Management Act, be afterwards informed, "We do not object to your design, but to porticoes."

I enclose a tracing from my drawing for the proposed portico, in order that you may judge how far it would have interfered with light and air. The materials were to have been Portland stone, with polished Aberdeen granite shafts, and it would have been much smaller and lighter than any other in the street.

JOHN DWYER.

MANUFACTURE OF BRICKS.

Blue Bricks.—In the article on the manufacture of bricks in your last number, the blue or dark-coloured bricks of the Birmingham district are mentioned as being made by exposure to a greater heat than that requisite for burning red bricks, and it is added, that "the iron, melting at a lower temperature than is sufficient to destroy the bricks, gives the outer surface of them a complete metallic coating." I have been told by workmen employed in the manufacture, that when a well-shaped brick is required for outside work, it is usual to produce this metallic coating by throwing salt on the fire the last time fuel is put on before closing the fire-holes. The reason given is, that as the temperature at which the iron melts is but little below that sufficient to destroy the brick, if the blue colour is obtained by simple heat the greater part of the bricks are sure to be more or less misshapen. In Shropshire, I am told the same effect is produced by sprinkling powdered ironstone over the brick before burning. I would trouble you to inquire if the above statements are correct, as I have found it very difficult to obtain information on this subject, my experience in brick-making having been limited to making the common red brick on a farm near here. In one case, the man who undertook the burning offered to produce blue brick if I would supply the salt, but I did not like to run the risk of spoiling a kilnful, without knowing more about the subject; and I have found the blue brick-makers very uncommunicative. S. P.

Iron, Bricks, Pipes, and Tiles.—As you are now noticing Mr. Chamberlain's paper on the manufacture of bricks, allow me to refer your readers to my correspondence last year on this subject, showing the capability of not only making one fire produce from clay, direct from the pit, in less than two hours, a perfect and finished article (except the annealing or gradually cooling) of any form or shape, avoiding all the difficulties of drying and burning out of form, to which all other processes are liable; and as the waste heat of the furnace is not required, it may be applied for generating steam, drying, and burning common bricks, lime, cement, &c.; and as I perceive by the supplement to the *Mining Journal* of last week that Mr. Bessemer's improvements in the iron manufacture are calculated to dispense with the puddling of iron, I would suggest the employment of the puddlers and their furnaces in the manufacture of iron and clay slags, and thereby retain the use of the waste heat for generating steam for rolling the iron, tempering, moulding, drying, and burning common bricks, pipes, tiles, &c. As slag direct from the furnace is moulded into any form or shape, similar to glass, in less than two minutes, and the iron moulds ready for use again immediately, the article is taken out and placed in the oven to anneal. By this simple process all the difficulties of tempering, moulding, drying, and burning, as appear by the paper above referred to, are overcome, either upon a large or small scale, as the melting process is applicable to both in every locality, and more particularly to situations remote from an established brickyard, where a quantity of bricks are wanted at a short notice for a special purpose only, such as the building of a bridge or tunnel, and where the carriage would exceed the cost of the articles manufactured on the spot, from earth required to be removed for foundations, as, with the assistance of moveable machinery to temper and mould common bricks, the clamping system might be adopted for burning where it would not answer to build permanent kilns.

W. G. ELLIOTT.

TOWER-HILL AND ITS NEIGHBOURHOOD.

I WISH you could spare time to visit Tower-street, and also Postern-row, Tower-hill, for the purpose of looking at the tinkering going on in both places. At the corner of Mark-lane a ricketty old house is not to be pulled down because the public service requires that some 50 or 60 square feet should be added to the inconveniently narrow footway. But this is nothing to the Woods and Forest Commissioners' proceedings at Postern-row, where some real improvement is so much needed that several Acts of Parliament have been passed to effect it, and it was the first on the list of thoroughfares which the Commissioners for Metropolitan Improvements gave as imperatively required. Ten years ago that might have been done for a few hundred pounds, which will now cost as many thousands, owing to mismanagement or supineness. So absolutely necessary was something required to be done, that the City authorities have stepped beyond their jurisdiction to make the roadway at least passable. Whom the footway round the Tower belongs to, I do not know, but it is in a state too disgraceful for even the field-marshal, who rules in the neighbouring fortress, to be supposed capable of approving. X. Y.

RAILWAY MATTERS.

Sleepers.—Some experiments have recently been made by the Permanent Way Company at Westminster, showing the operation of Dr. Boucherie's patent process for preserving timber sleepers from decay. The object of the process is first to expel the sap, and then fill the pores of the timber with a preservative solution. The apparatus is very simple, and the cost of the whole, it is said, need not exceed 50*l*. It consists of a slate tank, containing a solution of sulphate of copper, placed at an elevation of about 32 feet from the ground. Flexible tubes convey the solution to the timber intended to be preserved. A cap is fitted to one end of the piece of timber, and the flexible tube conveys the solution to it. The pressure from above forces the sap gradually out of the other end of the timber, and as that is accomplished the solution follows the sap, takes its place, and the operation is completed. It appears from official statements that this process has been applied with success on the Northern of France Railway, where upwards of 80,000 beech and birch sleepers so prepared and laid in 1846, were found, in 1856, to be as sound as when first laid down. It also appears that about 230,000 telegraphic posts in France have been successfully treated by the same process. The great object appears to be, to apply the process to cheap wood, such as Scotch fir, beech, elm, and other timber, immediately after the tree has been cut down, with a view to make it available in place of more expensive timber.

New Station at Chippenham.—A new station is to be built at Chippenham for the Great Western Railway Company. It will be a covered structure 140 feet long, having a covered platform of 400 feet, with spacious offices and commodious waiting-room suitable for the increasing traffic there. The present goods station will also be taken down and a larger one erected a short distance up the line. The contract for the new works has been taken by Mr. Brotherhood, who has already commenced clearing the ground.

New Route to India.—The paper on a Syro-Arabian Railway, contributed to the geographical section of the British Association by Mr. Locke, suggested a line of railway from Acre to Busrah, passing the Jordan between the 32nd and 33rd degrees of latitude, to be continued from Busrah along the southern shore of the Persian Gulf, and crossing the northern spur of the Arabian peninsula by Bireimah to Sohar, to proceed coastwise to Maskat, and thence to Bombay. The gain *in space* of this line over the proposed Euphratean routes was stated to be 400 miles; and *in time* (making due allowance for greater velocity of locomotive than steamer), two days and a half, and, over the present overland route, 1,000 miles, or six days, which might be increased one day and a half by accelerating the speed in the long level reaches of the desert, where the traveller can observe, at the distance of several miles, any object of a size calculated to impede or endanger a train.

AUSTRALIAN NEWS.

THE Melbourne Market Committee had approved of the plans of the proposed new Eastern Market on 1st April. The plans are from the design of Mr. M. P. Smith, the city surveyor. The dimensions of the market are, as compared with any public edifice that has yet been erected in Melbourne, gigantic. The extent of the front exceeds, by nearly 100 feet, that of the Western Market—the latter having only 232 feet frontage, while the proposed Eastern Market will have 330 feet. The sides are to extend 313 feet, the whole forming a quadrangle. The frontages will abut on Bourke-street, Stephen-street, Little Collins-street, and a new street to be formed at the western extremity, from Bourke-street to Little Collins-street. The style of the chief buildings will be Italian. The estimate of cost will be nearly 40,000*l*. The income anticipated from rents is 9,500*l*. a year.

The several classes of mechanics and workmen at Melbourne have been holding meetings to obtain a general combination for restricting the time of labour to eight hours per day, which they contend is quite as much as ten hours in the mother country, considering the difference of climate. All the meetings of the different trades had been unanimous on this question up to the last despatches.

The executive at Melbourne had accepted a tender from Messrs. Holmes and Co. for the construction of 3½ miles of plank road, at a short distance from town. The amount of the contract is 16,900*l*. being at the rate of nearly 5,000*l*. per mile. The Government have also accepted tenders for the erection of mile-posts upon the roads in the vicinity of Melbourne.

The following appointments in connection with the Victorial railway department had been made by the Acting-Governor:—To be Engineer-in-Chief and Surveyor, Mr. George Christian Derbyshire, C.E.: to be Engineers and Surveyors, Mr. Charles R. Sayer, C.E.; Mr. Robert Watson, C.E.; Mr. William B. Hull, C.E.; Mr. William A. Zeal, C.E.; Mr. William H. Greene, C.E.; Mr. William F. Hardie, C.E.; Mr. Frederick C. Christy, C.E.; to be Draughtsmen, Mr. Robert Adams, C.E. and Messrs. William E. Bryson, Adam A. Jackson, and Samuel W. Kemp.

The *Australian Builder*, speaking of colonial resources, says:—Some time since, Captain Pasley, the Commissioner of Public Works, published a general invitation soliciting samples of all kinds of building materials indigenous to the colony. This very commendable act has not been disregarded, many intelligent persons having been induced to turn their attention to the discovery of new and the improvement of existing materials. We have inspected several samples of fine granite from the Plenty, Mount Gellibrand (Broadmeadows), and Western Port, and a very beautiful specimen of porphyry, which is said to abound on Gabo Island. We have also seen some samples of blue lias cement, now being tested by Mr. Knight, the resident architect at the Houses of Parliament, and so far as the trial has gone the material appears to be of a very superior quality. Mr. Knight has also manufactured a small quantity of plaster

from colonial gypsum, but the sample forwarded to him was insufficient to make a fair experiment. The manufacture of bricks has also been wonderfully improved. A new kind of prepared brick, made by steam power, has just been turned out from an establishment on the Salt-water River, superior to anything ever made or even imported into the colony. In addition to the uniform squareness and beauty of these bricks, they are found to be perfectly fireproof, and fully equal to the celebrated Stourbridge clay.

In the department of Public Works, at Adelaide, according to the *Adelaide Observer*, of May last, "the committee advised no specific retrenchment of expenditure, but counselled general reforms in the service: the Government have, however, greatly reduced this item: instead of 600*l.* for occasional overseers of works, they have put down 100*l.*; on forage 50*l.* are saved: the salary of the colonial architect is now entered at 393*l.* instead of 600*l.*; and the salary of the assistant colonial architect at 300*l.* instead of 400*l.*: a draughtsman at 208*l.* disappears, and sundry reductions are made in clerks' salaries."

The new Congregational Chapel recently erected at the junction of the Norwood and Kensington townships, according to the same paper, was opened in April. The chapel stands at the end of the Norwood-parade, its principal front facing westward, and forming a conspicuous object along the Parade. The windows are filled in with stained glass. The interior fittings consist of open pews in cedar, with Gothic panels. The architect was Mr. George Abbott, of Adelaide; the builder, Mr. Samuel Lewis, of Kensington. The chapel, including all expenses, cost 2,196*l.* 14s. 6d.

BATS IN CHURCHES.

I see by your paper of the 26th April, a churchwarden wishes to know how to rid his church roof of bats,—animals which abound in this country, and in some places are a great nuisance. The method adopted here, and which is most effectual, never failing to drive them from the house, is to tie portions of the prickly pear (a species of cactus growing wild here, and of which they make hedges), on a string across the room, or even on the bottom of the punkah (it is my misfortune to be in a country where such things are required). The bats, in their blindness, fly against the spines, half an inch long, and suffer so severely, that they soon desert the house where this expedient is tried. The prickly pear could, I feel sure, be obtained in many places in England.

Rajahmundry District, Madras Presidency. INDICUS.

Notices of Books.

Aphorisms on Drawing. By the Rev. S. C. Malan, M.A. Vicar of Broad-Windsor. London: Longman and Co. 1856.

This nice-looking little volume, inscribed with propriety to Mr. J. D. Harding, contains some useful remarks, in short sentences. There would seem to be, however, in the rev. author's mind, some confusion as to the meaning and the aim of drawing. He says, "Drawing is human art, in *imitation* of nature." We need scarcely give any reason for saying that it is nothing of the kind. It may represent, but never seeks to imitate. The author considers drawing in a two-fold aspect, "as *positive*, or *real*, and as only *relative*;" and proceeds to define real drawing as "an image of God's works," and relative drawing as "an imitation of man's work." Drawing is the art of justly representing the appearances of objects by a certain process, and a view of the summer-house we have set up in our garden may be as fully real drawing as the representation of the everlasting hills which form the back-ground. Harm is done, as it seems to us, by seeking to invest a necessary and easily acquired power, which all ought to possess, with higher attributes than belong to it; and we do not think it necessary, therefore, to believe with the author that the idea of *devotion* "of right belongs to drawing" (any more than to every act of our lives), "since drawing is an image of God's fairest works." We deny altogether that no one can ever learn drawing unless naturally qualified for it by a combination of gifts, and protest against the doctrine, that "it is of no great use to teach children to draw before the age of fifteen or sixteen." All can learn to draw, and the earlier they begin, the greater will be the power they will acquire over the pencil.

VARIORUM.

The twelfth edition of "Black's Picturesque Tourist of Scotland" (C. and A. Black, Edinburgh) has been issued. A twelfth edition speaks for itself, and all we need say is that it abounds with illustrations, and forms an excellent guide to tourists in Scotland.——The fourth and concluding treatise of Messrs. Walton and Maberly's scientific series, by Dr. Lardner, titled the "Handbook of Natural Philosophy," is now published. It treats of electricity, magnetism, and acoustics, and completes a new edition of a very valuable and standard work. Many hundreds of engravings have been added to those of the previous edition, already numerous.——"An Introductory Lecture on Education, being the first of a series of plain and simple Lectures on the Education of Man," by Thomas Hopley, F.S.S. author of "A Lecture on Respiration," favourably noticed by us some time since, has been published by Churchill, of New Burlington-street. This is one (and the first) of a series written with a view to delivery in London for behoof of the funds of various charitable institutions. The training of the faculties and organs in general during childhood is treated of in this introductory lecture, and the views appear to be in general harmony with those of a sterling treatise by Dr. Andrew Combe on a similar subject.——Relfe, Brothers, of Aldersgate-street, have published "A Complete Guide to Government Appointments, and to the Civil Service Examinations," by J. C. Hurst, of Her Majesty's Civil Service. Besides lists of the branches of education requisite in candidates for the various Government offices, it contains some curious specimens of the results of past examinations, in defective spelling, and various other information, including an analysis of the Civil Service Commissioners' report, and a general preface.——"The Metropolitan Reformatories and Refuges," published by the committee of the Reformatory Union, 118, Pall-mall, gives an interesting and authentic account of some thirty institutions.——An important lecture on epidemical forms of disease, and the necessity and advantage of pure air and light to healthfulness in towns, on malaria and other poisons (such as lead), and on other sanitary subjects, has been published by Bell and Daldy, under the title of "The Progress of Preventive Medicine and Sanitary Measures." It comprises the Thruston speech on the Wendy Commemoration, at Caius College, Cambridge, delivered in May last, by A. W. Barclay, M.D. officer of health for St. Luke's, Chelsea.

Miscellanea.

The Hull Glass Company.—This company, which was established and failed at Hull, is about to be completely wound up, after being in Chancery since April, 1850, the date of the order to wind up.

"The Georama."—A company is in course of formation to carry out a patented improvement in pictorial representations, by which, it is asserted, countries, cities, towns, and villages, with their surrounding or connecting scenery, may be impressed upon the imagination of the spectators, or nearly so, as if they were viewing the real objects themselves! "Persons who have visited dioramic exhibitions, similar to those at present in use, are aware that the scenery passes from right to left, or from left to right, in front of the spectator; but by this novel mode of exhibition, the scenery will pass sideways, or on each side of the spectator—so as to represent, at one and the same time, both sides of any street, road, river, canal, harbour, &c. In other words, the scenery will move from the centre, in front of the spectator, divergingly or obliquely, to either side; and as it thus passes, the spectator will fancy himself in the act of moving forwards, whilst the scenery will appear to be fixed and stationary."

Purify! — Will you allow me to make a brief sanative suggestion through the medium of your columns? In order to counteract the toxical gases abounding in the atmosphere of all large towns, and so productive of phthisis, I beg to propose that large superficies of matter be formed, of such composition as will cause the absorption of such gases. Carbonic acid gas and sulphuretted hydrogen, our two greatest enemies, might be counteracted by the familiar chloride of lime, exposed in sufficient quantity.—O. H. H.

*** We have often said that municipal and other authorities ought to be obliged by law to make large use of such agencies.

Death of Mr. James Bremner, C.E.—Mr. James Bremner, civil engineer and shipbuilder, at Pulteneytown, Wick, retired to bed in his ordinary state of health on Wednesday in week before last, but was suddenly taken ill, and died before twelve o'clock. Mr. Bremner's share in removing the steam-ship *Great Britain* off the strand in Dundrum Bay is well known: the fatigue he then underwent, says the *Scotsman*, tried his iron constitution very much, he having been almost constantly employed night and day for about three months.

Relics discovered at Taunton.—The workmen of Mr. Jeboult, builder, have found in the middle of the wall of a house in Fore-street, Taunton (probably about 250 years old), several specimens of the remains of Ham-hill stonework, supposed to have formed part of the porch of the Portman town residence, which formerly stood near the spot. The pieces appear to have been worked up in the original building, and consist of several carved bosses on the intersection of a groined rib, a carved gurgoyle, stone pattern complete, portions of the jambs of doors and tracery of stone windows. The workmen also discovered about the same time, whilst making alterations in a house in North-street, several sandstone chimney mantels, one of which is richly cut in sunk Gothic tracery, and was found in its original position, but covered with plaster and rubbish; also a moulded oak casement window, taken from the north wall.

Antiquarian Remains at Cardiff.—The workmen employed in constructing the town drainage at Cardiff discovered, last week, the vaulted entrance of a subterraneous passage in that portion of the road which passes along the pine end of the Cardiff Arms Hotel. On opening the aperture, so as to admit ingress, it was ascertained that the passage extended for about 50 feet beneath the pavement, and terminated in a Gothic arch, which had been blocked up with masonry of a later date. The passage appeared to have been ventilated from the roof in two places. These outlets were of a circular shape, lined with masonry, and had been closed at the summit with pieces of timber, still visible, supported by iron bars. The passage crosses the road diagonally from the small window of the Cardiff Arms Hotel towards the Castle Lodge, but it has not been opened more than 73 feet. The arch is roughly but solidly formed of Leckwith limestone, and the sides of river pebbles. The passage is supposed by some to have formed a communication between Cardiff Castle and an ancient mansion, which, in the days of the Commonwealth, stood on the site now occupied by the dead-house, with the view of affording the inmates of the castle an opportunity of escape in those troublesome times. It is also believed that this subterranean passage extends beneath the bed of the river Taff, to another ancient house, which formerly stood on the opposite side. On condition of a large reward being given him, a soldier is recorded to have showed the Protector's army a secret subterranean passage, which communicated with the castle beneath the bed of the river Taff, by means of which the garrison was surprised during the night. Cromwell having obtained the castle, the soldier was very properly hanged as a reward for his treachery.

The Great Bell for Westminster Clock.—This bell has now been raised from the pit, and was sounded for the first time with a clapper of 7 cwt. on Friday last. The casting is said to be clean, and the tone fine. The diameter is 9 feet 5½ inches; the height outside, 7 feet 10½ inches; inside 6 feet 8 inches; thickness of sound bow, 9 inches; of the waist, 3 inches. It has not yet been weighed, but, as it has shrunk less than was expected in casting, it is believed that the weight will be rather over 15 tons. The note is E natural. The bell has the following inscription running round it, just above the sound bow:—"Cast in the 20th year of the reign of her Majesty Queen Victoria, and in the year of our Lord 1856, from the design of Edmund Beckett Denison, Q.C.; Sir Benjamin Hall, baronet, M.P. Chief Commissioner of Works." On the waist or middle of the bell are the Royal arms, and the names of the founders and patentees of the mode of casting which has been adopted for it,—"John Warner and Sons, Crescent Foundry, Cripplegate, London." The certificate of Professor Wheatstone and the Rev. W. Taylor, F.R.S. or one of them, is required in addition to that of Mr. Denison. The quarter bells will now be proceeded with: the largest of them will be 6 feet in diameter, and will weigh about 4 tons, and is also to be cast at Norton, near Stockton-on-Tees.

A Large Gasometer.—A gasometer of enormous size, no less than 200 feet in diameter, is in course of construction for the Imperial Gas Company, near Stanley-bridge, in the King's-road, Chelsea. It comprises about 1,000 tons of iron, and, including the tank, will probably cost more than 20,000*l.* Messrs. Westwood and Wright, of Dudley, are the contractors. The works of the company here are now becoming of immense extent.

Boring and Excavating.—Mr. R. A. Brooman has patented an invention (a communication), which consists of certain arrangements of machinery, driven by steam or other like suitable power, whereby earth, stone, and rock are bored or excavated. The *débris*, or part dug out or excavated, is deposited in waggons, at the side or out of the track of the machine, and whereby the machine is made to propel itself forward; all these actions being simultaneous, and communicated from the same prime mover. Immediately behind the excavating tool a series of hollow funnel-shaped gatherers are fixed upon the shaft, and again behind them a hopper, which by means of slides is made to open to one or both sides, or to the centre of the machine.

Destruction of Ancient Relics in Scotland.—Another interesting antiquity has just been destroyed. The *John O'Groat's Journal* thus speaks of it:—The Dwarfie Stone of Hoy (one of the Orkney isles, if we mistake not) has, we understand, been irretrievably destroyed by the barbarian hands of some visitors to the island, who, to all appearance, maliciously lit a fire within the excavation in the stone, and by that means succeeded in splitting it into fragments. A reward has been offered to any one who may give such information as will lead to their conviction.

Opening of the Grand Belgian Economic Exhibition.—*L'Exposition d'Economie Domestique de Belgique* was opened at Brussels on the 25th inst. under the special patronage of King Leopold, and at the sole expense of the Government. It is held in Les Jardins Botaniques, and under the buildings attached to these grounds. The Minister of the Interior, accompanied by several of his *attachés*, inaugurated the opening. This is an exhibition emphatically for the working classes, and to attract the beholder by the simplicity and economy of the main articles necessary for the comfort and convenience of a family. It is held preliminary to the *Congrès International de Bienfaisance*, which is summoned for the 15th of next month, and which is to consider the most effectual means of improving the condition of the industrious classes throughout the world, and to adopt such measures as may be deemed necessary for the promotion of that view. The objects exhibited are divided into six classes, which are again subdivided into a great number of details. These classes are—1st, Lodgment and Construction; 2nd, Furniture and Household Objects; 3rd, Clothing; 4th, Food; 5th, Tools and Implements of Manual Labour; 6th, Education and Instruction. The lowest price is marked upon each article. It is proposed that the exhibition shall remain open until the 1st of October; that the visitors shall be admitted gratuitously from ten to four o'clock each day, on Sundays, Mondays, and Thursdays; and that on the other days of the week they shall be admitted upon payment of half a franc each. A vast number of persons entered the building on the opening day.

A Dublin Athenæum.—A new literary institute, named the Dublin Athenæum, has been formed in Grafton-street, in the southern part of the city. Classes are in process of formation, reading-rooms and conversational galleries have been established, and a library is in course of collection. Lecturers are being engaged, and other arrangements made, for an active opening session.

Mortar in Ancient Buildings.—In corroboration of your statement in the last *Builder*, respecting the durability of mortar in ancient buildings, the following may be a farther illustration. It was only yesterday that I was examining, with an intelligent builder, the sole vestiges remaining of the ancient castle of *Oswestry*. These vestiges comprise two large masses of masonry, each containing several cubic yards, one of which, though completely turned out of its bed, still retains its integral tenacity: the other stands as the builder laid it. They are portions of the keep, and must date nearly as far back as the Conquest, if not anterior to that period. The masonry is of the very rudest kind, and is composed of large and small boulder stones, lumps of red sandstone, and flints. They appear to me to have been laid dry at first in indiscriminate rubble, and grouted or flushed at intervals with mortar, composed of lime, sand, and pebbles; thus, from the shape of the stones, giving a proportion of nearly one-fourth of mortar to the entire structure. Nor does it appear to me that a hammer has been used even to the face of the wall, which is composed of the same sort of stone, but laid close, and as even as the surface would admit. Notwithstanding * the exposure of this mortar to the atmosphere for ages, in a bleak situation, it will still resist the blow of a hammer as well as stone, and it must have cost some powder and shot, in more senses than one, to bring it to a ruin, such as the wind might reduce some of our modern buildings to.

J. Blake.

* Read "Because of."—Ed.

The Restorations at Christ Church Cathedral, Oxford.—The restorations and alterations at Christ Church Cathedral, which are being effected by Messrs. I. and W. Fisher, of Oxford, builders, from the designs of Mr. John Billing, are progressing rapidly. The architectural features of the edifice, and more especially the groined roof, with its carved pendants, instead of being, as hitherto, in some measure concealed, will be prominently brought out to view. According to the *Oxford Journal*, the present dean, Dr. Liddell, aims at putting Christ Church Cathedral, as far as is practicable, on the same footing as other cathedrals, with regard to the public. The north transept, immediately opposite to the organ, is to be devoted to the public, and is to be fitted up with seats, which will accommodate at least 300 persons. The edifice, being not only a cathedral but a college chapel, it has been found necessary to modify the new arrangements, to suit both these characteristics. During the progress of the work, two sarcophaguses, or stone coffins, have been discovered. One of these was found on the south side of the choir, and the other in a corresponding position, between the second and third columns, on the north side of the choir, and almost on a level with the ground, forming, probably, at one time, a part of the paving, as the lid is richly sculptured with a long cross and other ornaments. On removing the lid, which appeared to be of the twelfth or thirteenth century, all that were found were remains perfectly decomposed, a portion of a shoe, remnants of the burial dress, and one bone—but no skull: in the coffin were also found a pewter chalice and paten. The coffins have been allowed to remain in their original resting-places.

The Wellington Statue at Manchester.—According to the *Manchester Guardian*, upon a pedestal of granite stands the statue of the duke: at each angle of the pedestal is a small projecting foot or pedestal for the reception of a subordinate figure: the two figures at the front angles are (to the spectator's left) Mars or Valour, and (to the right) Minerva or Wisdom. Behind Mars is the reward of valour—Victory: behind Minerva is the reward of wisdom—Peace. In four panels or plinths in the square of the pedestal will be placed as many bas-reliefs, but not in time for the inauguration. That at the rear is to portray the battle of Assaye, Wellington's greatest victory in India; that in front, the battle of Waterloo, his crowning victory in Europe. Between the figures of Mars and Victory is to be a bas-relief of the Congress of Vienna; and between Minerva and Peace another representing the duke receiving the thanks of the House of Commons. The statue and the four subordinate figures are all of bronze. The figures were cast by Messrs. Robinson and Cottam at their Pimlico works, and the aggregate weight of metal in them is about ten tons. The statue of the duke alone weighs five tons, and stands 13 feet high: the granite pedestal is about 19 feet in height, and weighs about 100 tons.

Archæological Excursions.—The annual excursion of the North Oxon Archæological Society was fixed for Thursday and Friday in this week, the 28th and 29th inst. Starting on the first day from Brailes, they were to proceed to Compton Wyniatts, Tysoe, the Sun Rising (where they were to lunch), Warmington, Shotteswell, and back to Banbury, where, in the evening, there was to be a meeting in the Vicarage Hall, Mr. W. Dickins, of Cherrington, in the chair. On Friday the route was to be to Adderbury, Deddington, Somerton, Middleton Stoney, Wendlebury, Weston-on-the-Green, Alchester, and Bicester, at which place the company were to dine. The Worcester Diocesan Architectural Society made, some short time since, a proposal to the Oxfordshire Society to join in this excursion: the offer was accepted, and a larger concourse of strangers than usual was anticipated.

A Model City.—We can imagine a city with no ground floors; with every house upon an elevated foundation; the drainage, the gas and the water supply, carried on through ducts, easily constructed, accessible in every part, and under constant inspection. We can imagine the railway on the same level, noiselessly distributing its hundreds of thousands, regularly throughout the day; the omnibus—lumbering make-shift of a half-civilised community—disappeared; the horse, rude slave of a barbarous unscientific time, preserved only as the slave of the rider for pleasure; a builded esplanade above the railway; above the aqueduct, the drainage and gas ducts, on a level with the lowest floor of the houses; the whole of the underground of life accessible to the inspector and the workman, ventilated, and constructed to assist in maintaining the health of the whole metropolis, instead of being the source of poison. We can imagine trades and callings distributed into classes and districts; the penny railway ride being only a customary portion of the rent. The houses of all classes, palaces; the roofs, emancipated from smoke, garden-terraces; and the view from any elevated tower, a picture of health and beauty, of animated movement without crowding.—*Spectator.*

Statue of Vandyke.—At Brussels during the late *fêtes*, a statue of Vandyke, the work of M. Cuyper, a native architect, was inaugurated.

[ADVERTISEMENT.]

MESSRS. CLARK AND CO.
15, Gate-street, Lincoln's-inn-fields.

Gentlemen, — After eight years' trial of your Patent Revolving Shutters, erected here, I can safely pronounce them most effectual in their action, and they have given me the utmost satisfaction.

I am, Gentlemen, yours truly,
Geo. Downe.

155, Leadenhall-street, August 7th, 1856.

TENDERS

For building school and residence, St. John's, Upper Lewisham. Mr. Joseph Peacock, architect:—

Thompson	£1,416 0 0
Wells	1,380 0 0
Patman and Co.	1,339 0 0
Todd	1,278 0 0
Harmer	1,268 0 0
Peper and Son	1,256 0 0

For an Independent chapel and schools, at Banbury, Oxon:—

Orchard and Co.	£2,599 10 0
Claridge	2,150 0 0
Chesterman	1,680 0 0
Davis (accepted)	1,397 0 0

For re-building premises in the rear of 134, Fleet-street. Mr. C. H. Howell, architect:—

W. Cubitt and Co.	£4,645 0 0
Brown and Co.	4,542 0 0
I'Anson	4,534 0 0
Lucas, Brothers	4,231 0 0

For the erection of new parsonage-house, at Little Brickhill, near Fenny Stratford, Bucks. Mr. Arthur Billing, architect. Quantities supplied:—

Williams (Luton)	£1,497 0 0
Andrews (Tring)	1,445 0 0
Cooper (Aylesbury)	1,325 0 0
Lawson and Joy (Bedford)	1,325 0 0
Quarterman (Oxford)	1,298 15 0
Chesterman (Banbury)	1,198 0 0

For hotel, to be built at Knightsbridge, for Mr. Martin Wallace. Mr. F. R. Beeston, architect:—

Myers	£7,700 0 0
Cubitt and Co.	7,580 0 0
Lucas and Co.	7,308 0 0
Holland	7,197 0 0
Wilkinson and Son (accepted)	7,189 0 0

For alterations to Mr. White's premises, 68, Cheapside. Messrs. Tress and Chambers, architects. Quantities supplied:—

Brand	£1,498 0 0
Brown (College Hill)	1,437 0 0
Brass and Sons	1,397 0 0
Downs	1,360 0 0
Lawrence and Son	1,342 0 0
Macey	1,289 0 0
Tolley	1,283 0 0
Harmer	1,044 0 0

For a Chapel of Ease, in Lombard-street, Mint-street, Southwark, for the Rev. William Cadman. Mr. Arthur S. Newman, architect. Quantities supplied by Mr. Arthur Billing:—

	Kentish rag and Bath stone dressings.	The same with terra-cotta dressings.	Picked stocks and Bath stone dressings.	The same with terra-cotta dressings.
William Winder	£1,461	£1,391	£1,397	£1,327
William Higgs	1,355	1,300	1,355	1,280
Peace and Tuckwood	1,282	1,224	1,225	1,153
Pollock & McLennan	1,277	1,200	1,259	1,182
Dove, Brothers	1,197	1,197	1,175	1,175
Patrick and Son	1,175	1,090	1,140	1,055
Joseph Peake	1,125	996	1,087	958
T. and J. Coleman	1,113	1,056	1,069	1,022
William Wills	1,012	991	994	971
Joseph Harnden	920	940	—	—
Benj. Wells (accept.)	890	878	865	853

The terra cotta was specified to be supplied from Mr. Blanchard's Works, Blackfriars-road.

TO CORRESPONDENTS.

"*Taking out Quantities.*"—Sir,—As one of your oldest subscribers, I will feel obliged by any of your correspondents replying to the following:—It is usual with many architects to employ building surveyors to take out quantities: can the architect demand a copy of the detail calculations?—S Y.

"E. W. T." (publication would not be desirable at this moment).—"B. B. B."—"W. P."—"J. G."—"W. G. E."—"Subscriber."—"C. R. S."—"D. G. A."—"C. E."—"W. R."—"Otho."—"F. J. F."—"J. C."—"G. W."—"H. A. H."—"C. Estate."—"G. T. R."—"E. A. S."—"B. B."—"A. B."—"J. C."—"St. Columb"—"J. C. H."—"B. O. B." (under our limit).—"W. D. M."—"F. S."

Erratum.—For Duke of Alnwick, p. 464, *ante*, read Duke of Northumberland.

NOTICE. — All communications respecting *advertisements* should be addressed to the "Publisher," and not to the "Editor:" all other communications should be addressed to the Editor, and not to the Publisher.